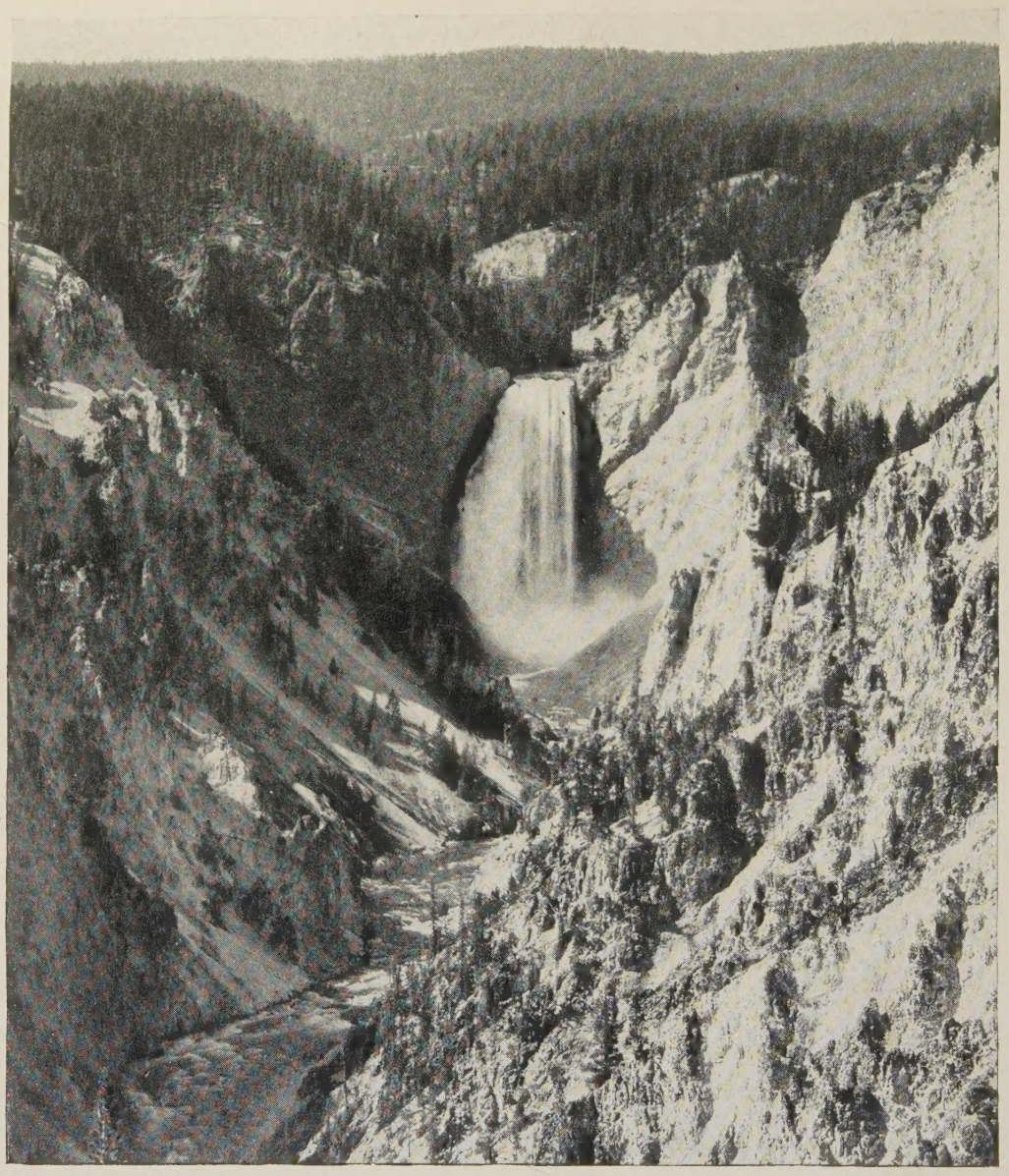
NATURE MAGAZINE

MAY 1930 35¢ VOL. 15, NO. 5



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THE Land of Sky-Blue Water, the Land of Hiawatha, the Land of Lakes—these and other titles have fastened themselves upon the States of Michigan, Minnesota and Wisconsin to which this number of Nature Magazine is dedicated. The editors, in creating this issue, have borne in mind the travel-inclined, for here is a land that must be visited before the spirit of America is completely understood.

* * *

The northern sections represent, probably as well as any in America, the rugged wilderness which the pioneers found. There are endless miles in all three states where the canoe is the only mode of travel and the lake and river the only highway. There are beauty spots where moose and deer come at eve to drink; muskrats and beaver shatter the quiet reflections on the lake waters. Perhaps the spectacular scenery and gigantic spaces of the West are lacking, but the 20,000 lakes, the great stretches of forest, the twining rivers have a different charm, just as alluring and just as tenacious.

Among the more delightful ways of either beginning or ending a trip to the Lake States is a cruise across Superior and Huron by boat. The starting point is Port Arthur, and for several days one skims across the mighty Superior, then through the locks at Sault Ste. Marie, then down Huron to Sarnia. Another marvellous boat trip is one down the Mississippi past the great bluffs that may some day be included in a National Park. A third jaunt should include a visit to Interstate Park, on the borderline between Minnesota and Wisconsin, where are the beautiful Dalles of the St. Croix river. Quetico Park, on the Canadian National Railways, and Devils Lake, in Wisconsin, on the Great Northern line are two other spots much sought out by the thousands that pour into the lake states during the summer months.

* * *

News from a neighboring country—Canada—reveals that the number of American tourists who visited Canada during 1929 equalled the population of the Dominion. More than 9,000,000 came in from the United States last year, according to the natural resources department of the Canadian National Railways. A quarter of a million visited the 23 national parks. More than 2,600,000 individuals found their way into the American parks during the same period.

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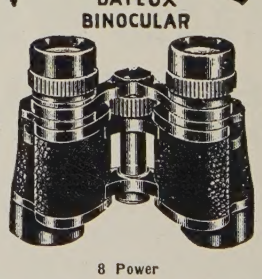

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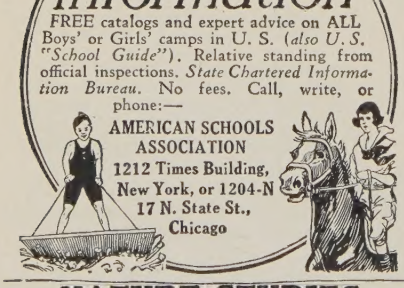

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* * *

"The glory that was Greece" is appealing more and more to Americans—as is "the grandeur that was Rome." Plato's olive grove, the Acropolis, the Parthenon and other spots in Athens sacred in the light of history; Thermopylae, Sparta, Delphi, where once the oracle proclaimed the destiny of men; the bluest of blue skies that arch above the bluest of seas—with these and many other attractions Greece promises to fulfill the dreams of years. The Hellenic Information Bureau, National Press Building, Washington, D. C. will help to arrange schedules and plans.

* * *

The American Nature Association trips to Grand Canyon, Bryce, Zion, Yellowstone, Glacier Park and Jasper National Park in Canada, and the two special yacht cruises up the Inner Passage of British Columbia have intrigued the interest of more than one thousand of the Nature Magazine readers, who have sent for the free booklet, *On Western Trails,* and queried the travel department for further information about them. So that no one will be disappointed in finding that a late application for a place on one of the trips is refused, it may be well to state again that no more than twenty will be taken on any one trip, as a greater number would mean that the naturalist who accompanies each party would not be able to carry his message to all and the informal, "happy family" type of group would be impossible. The most popular tour to date is, strangely enough, the most expensive—The Glacier Park—Inner Passage—Jasper National Park trip.

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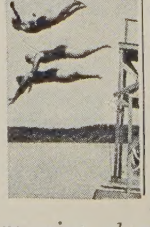

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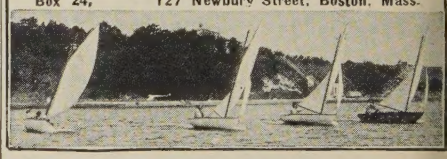

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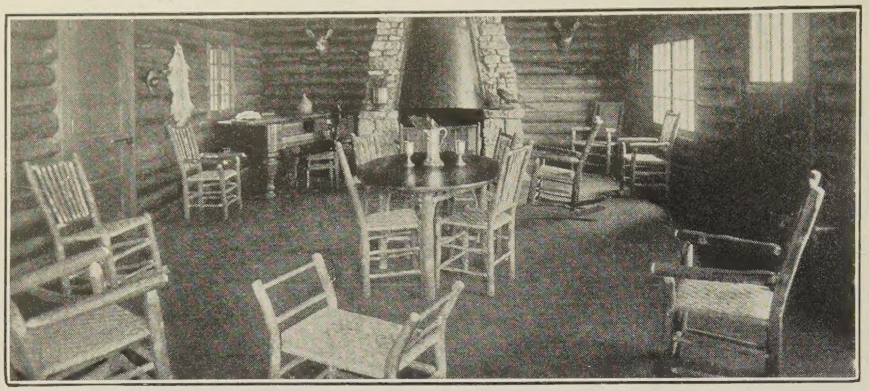

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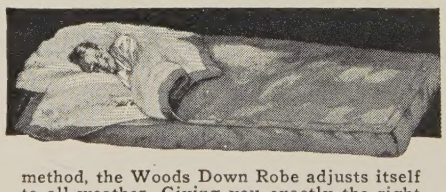

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At this time of year he or she who has a hobby of Nature photography is looking forward to the summer's opportunities. We find in the March issue of *American Photography* (which, incidentally, should be subscribed to by all photographically inclined) a helpful suggestion written by A. Brooker Klugh, Nature editor of that journal, under the title "The Camera for Nature Photography." Here is what he says:

"I have recently received several inquiries to what is the best type of camera for Nature photography. The answer is that there is no one "best" camera, if this means a camera which will do every kind of Nature work under all circumstances. There is however, a type of camera which will do about ninety-five per cent of the work which is included within the range of Nature photography, and which will, incidentally, prove to be nearly a "universal" camera, as far as all kinds of work—landscape, portraiture, genre, photomicrography, etc.—are concerned. This is the all-metal, double-extension, plate camera, fitted with a compound shutter and an anastigmat lens of from *f*:4.6 to *f*:6.8. Such a camera will handle all the phases of Nature photography, with two exceptions, these exceptions being the stalking of mammals and birds and the taking of flight pictures of birds. For these two phases of Nature photography the only type which meets the requirements is the reflex, and it should, for these purposes, be fitted with a telephoto lens.

"The chief points about the camera advocated above which render it especially suitable for Nature photography are as follows. The all-metal construction gives strength and compactness, and both of these features are of great value in Nature work, where the camera has to be carried on all sorts of trips and set up in all sorts of places.

"These all-metal cameras are always, as far as I know, supplied with single metal plateholders, and this type of plateholder I have found to be eminently satisfactory, both as to light-tightness and durability.

"That a camera for Nature photography must be a plate camera is quite apparent; firstly, because focusing on the ground glass is absolutely essential, and, secondly, because panchromatic and superspeed emulsions—which are the two types of sensitive material needed in Nature photography—are available only in plates and film-packs, which latter can, of course, be used only in a plate camera.

"The double-extension feature is one which is essential, as a great many subjects in Nature work are taken at such close range that the bellows length of a single-extension camera is entirely insufficient. With a double-extension camera life-size images may be obtained.

"The compound, or compur, shutter, is, in every way, a very satisfactory shutter for Nature work. It is not only durable and reliable, but has a range of speeds which includes 1/15, 1/10, 1/5, and 1/3 seconds, which are very useful speeds in Nature photography

(Continued on page 347)

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NATURE MAGAZINE

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THE AMERICAN NATURE ASSOCIATION

To Stimulate Public Interest in Every Phase of Nature and the Out-of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

THE MAGAZINE

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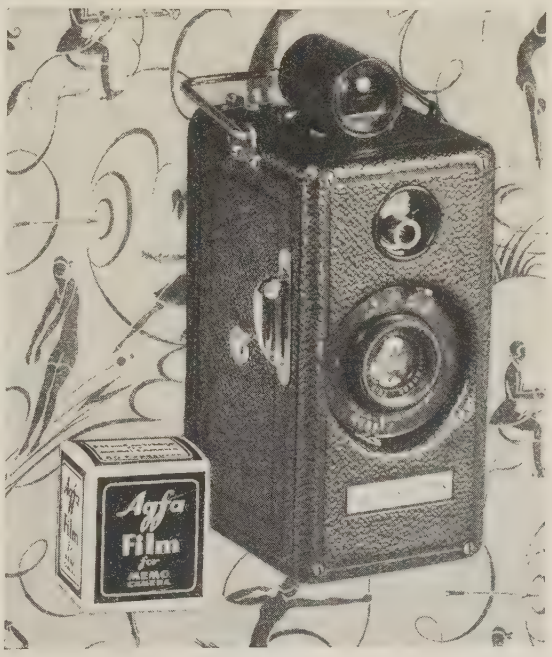

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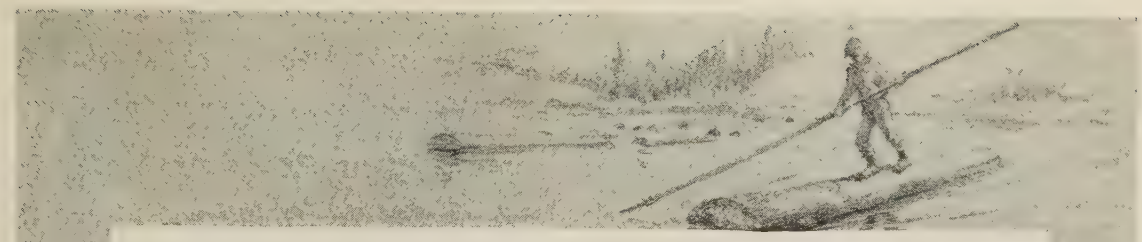
THE LOG JAM

Reproduced from an original etching by Frank W. Benson through the courtesy of Mr. Benson and George Gage



THE LUMBERJACK

by Tom Gill

FROM out America's yesterdays emerges one of the most colorful characters in all our history—the lumberjack. He stands apart. His home and life were the untrodden forest. He was an outpost of civilization, a conqueror of the wilderness, a pioneer. And he was wholly American.

To provide a nation's wood—that was the work of the lumberjack.

So through the Lake States' brief heyday of timber sovereignty he reigned, cutting the great logs of pine and spruce, driving them down the white waters of forest streams in flood time. His martial music was the ring of the axe and the saw's hum. Forests, centuries old, bowed at his coming. Before him the wilderness melted. Through cold, desolate winters he hewed the tall, straight trees. Each spring he rode the great logs down swirling waters to the world of men. He diced with death among falling timber. He defied the storms. He toiled in the very face of destruction, beneath the grinding menace of many a log jam, and he did it all with a careless laugh and a song.

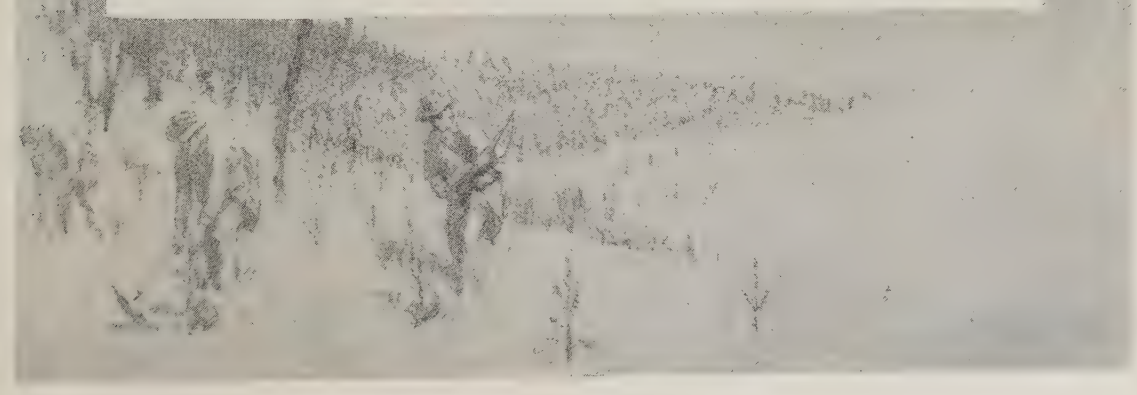
Those songs still linger and have become a part of our tradition. That story of his long, bitter fight against snow and flood is one with the saga of America. His turbulent reign was short, yet he has left an enduring imprint in the history of a pioneer nation.

But he himself has passed. From the Lake States he has vanished as completely as the fragrant forests that were once his life. The roads he built are choked with brush and weeds. His camps are mounds of crumbling logs. Deer stalk silently among forgotten skidways and the long rafts of pine and fir float no longer down the rivers that once resounded to his shouts. The hungry mills he fed so faithfully are no more.

And with his passing too have vanished those age-old forests of white pine and red that for a brief time made the Lake States preeminent among the timberlands of all America. The forests that men called inexhaustible are forever gone. They are a memory that fades. They belong to yesterday.

The day of the planter has come. Among charred stumps and on many a windswept sand dune, men are planting the forests of tomorrow. Row after row of tiny seedlings—pine and spruce and fir. Slowly and with infinite toil they are creating man-made forests to take the place of those vanished forests of yesterday.

To the yesterday of the nation belongs the passing figure of the lumberjack. Tomorrow is the day of the forest planter. For he it is, secure in his vision of the future, who dedicates his toil and his trust to a greater America yet to come.



H. ARMSTRONG ROBERTS

WHERE THE SIREN CALL OF THE LAKE STATES GROWS STRONGEST

None can resist its rushing streams, alive with fish; its trackless waterways, where canoes glide gently; its far-spread forests, home of wild life. Here are peace and health and happiness for a nation

NATURE MAGAZINE

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May, 1930

MINNEAPOLIS CIVIC AND COMMERCE ASS'N

WHY THE LAKE STATES ARE POPULAR

Such spots as this, where forest and hill and swirling sunlit water conspire to steal one's heart, each year call back to Michigan, Minnesota and Wisconsin countless numbers of outdoor lovers

The Land of Many Lakes

An Analysis of Its Charm and Wealth

by Ben East

Would you fain visit a region where the blue waters of three vast inland seas stretch away to far horizons, where dark forests of spruce and pine and hardwood march over hill and through valley, and where bright inland lakes are cradled like countless jewels among the rolling green hills of farmlands?

Then come to the three states of the upper Great Lakes region, where Superior, Huron and Michigan, among the greatest of fresh water oceans, break upon their sandy shores or beat against the feet of towering cliffs.

There you will find cool dim trails of the north country with soft pine needles underfoot and moss-bearded trees overhead. There you may drive a canoe through mile after mile of changing wilderness waterways. There you may build your campfire at night beside lonely forest-flanked lakes where deer come to water in the dusk and where loons will awaken you at moonrise with their weird calling. There you may tramp along sandy beaches or by the shores of glacier-polished granite to hear the ceaseless whisper of the surf.

Dark forests clothe the flanks of granite mountains in this land. Broad prairies stretch to the horizon, mantled with the bronze of ripening wheat. Fertile fields, barren dunes of shifting sand, wild rice marshes and swamps of tamarack, cliffs and waterfalls dot the countryside. These you must find, to know the beauties that here make their home.

Fire and ice have shaped the Lake States country. Fire of ancient volcanoes that once belched forth lava in quantities that belittle the great lava beds of Vesuvius, but that today are only worn down stumps of mountains. Ice of the great glaciers, hundreds and thousands of feet thick, that crept southward day by day and century by century, more slowly than the sand dunes

creep now, reaching down like mighty plowshares into the valleys, furrowing them deeper, scouring the plateaus, dropping here and there burdens of soil and polished boulders, damming rivers, making lakes, and ever-changing the land and all upon it.

From early spring until late winter the Nature lover and outdoorsman may always find enough to hold his interest in this border of the northland. Spring brings the migratory birds back home from their wintering grounds in the south—the wild goose, robin and bluebird and a host of others. In April a multitude of woodland voices ring out over the land, and May, enriched with the sweet songs of the bobolink echoing over the greening marsh, ushers in the warm days.

MICH. DEPT. OF CONSERVATION

CASTLE ROCK NEAR ST. IGNACE, MICHIGAN

Such rugged grandeur is typical of much Lake States country. Unfortunately recent commercialization has marred this spot

As early summer comes, the small birds of the woods raise their young and gulls and terns dwell in great noisy colonies on the islands of the lakes. The whippoorwill sets the June nights pulsing with his cadenced calling. Then, as the birds begin to gather for the long journey of autumn, a period of silence falls. Now the great fall flight is on, and beach and field, swamp and forest are alive with the feathered horde—warblers, shorebirds, wildfowl, birds of prey—all drifting steadily southward down the natural flightways.

Even with the coming of winter, the pageant of bird life in these states does not cease. Birds of prey—the savage raiders of arctic barrens and wooded northern wildernesses—sweep down with the winter blizzards. Jolly oldsquaw ducks, scoters and other waterfowl of the far north come to the lakes, seeking open water for the winter, minding not at all the floating ice floes, the thick smother of snow that sweeps over the gray water, or the bitter winds.

Even as the changing bird life marches with the seasons, so does the flower procession ever disclose new charms. While blackened drifts of snow still lie in the cedar swamps and on the northern hillsides, that first bright flower of spring, the fair arbutas, peeps forth, and not even in the New England woods does it blossom more charmingly than in the pine forests on the shores of Lake Superior, Huron and Michigan. It follows closely the first pioneer of flowerdom, the humble skunk cabbage, beloved by bears emerging from their long winter nap. Then come a legion of others—the strange pitcher plant, lady-slippers of pink and white and yellow and many another of the orchid clan, yellow and white water lilies, and the rare American lotus. On the pine lands, as summer advances, lupines blaze in wide blue meadows, wood lilies lift orange heads, bluebells nod in rock crevices, twinflowers carpet the dimly-lighted floor of the forest. Then the profuse march of summer thins out to the rear guard of fall, and the season closes with wild asters and goldenrod in a riot of color and fringed gentians nodding shyly in the marshes.

A. E. YOUNG

WHEN COMMERCE MINGLES WITH BEAUTY

Sunset on St. Mary's River, one of the Lake States' waterways whose charm is equalled only by its usefulness to man

The outdoor recrea-

tion of this region of lake, river and forest likewise follows the seasons. When spring takes the trout fishermen forth on thousands of miles of creek and river while the chill of melting snow is still in the fresh-swollen streams, half his hopes involve the taking of trout and half the feel of swift water tugging at his legs. But the angler for trout does not have all the spring and summer to himself, for many other fine fish dwell in the lakes and streams of the region, and in at least one of the three states—Wisconsin—the fisheries of sport are reckoned as of greater value than the harvest of commercial fish in the waters of Lake Michigan and Lake Superior.

WALTER HASTINGS

A WIDE WANDERER IN FLIGHT

The Caspian tern, winging homeward, represents but one of many species that hover close to the inland seas

June sees the invasion of the army of motor campers into the upper lakes region, and throughout the rest of the summer and even until autumn is well advanced, these caravans of motor gypsies move along the flowing highways, seeking rest and recreation—camping by the roadside or in the beautiful state parks, halting for a day to fish, garnering memories of the open road to last until another camping season. They find the rare beauty of the famous Dells of Wisconsin, the great cliffs along the shores of Lake Superior, the world famous sand dunes on the east shore of Lake Michigan and countless other places filled with charm or steeped in the dramatic history of the old Northwest. Or perhaps they leave the cars to strike into the wilderness by canoe, to weave amid the endless waterways along the rushing streams and easy portages followed by the pioneers and traders of a hundred years ago. Others cruise the larger lakes in varied craft and hold water carnivals and similar events on countless surfaces.

The opportunities the ice-gnomes bring from their northlands—the winter sports—are being rapidly developed in this land so ideally adapted to them. There are lakes and rivers for skating and iceboating, hills for skiing and tobogganing, forests that are white silent fairylands for snowshoeing, drifted highways for sleighrides. Winter carnivals are becoming yearly events in many localities and moonlit winter nights find more and more firesides deserted while across the snow-carpeted slopes flit increasing numbers of worshippers of the ice gods.

The flags of France, England and America have flown successively over much of this territory of the upper lakes, and there is rich material throughout the region for those who wish to delve into the proud story of America's yesterday. Père Marquette doubtless stands at the head of the list of illustrious names associated with this country. It was at St. Ignace, on the Straits of Mackinac, that the great Jesuit explorer established one of his first missions and fittingly it is there he now lies buried, not far from the bronze tablet erected on Mackinac Island in memory of Jean Nicolet, the first white man to pass through the straits, and the first to penetrate Wisconsin. This country saw countless Indian wars between the Chippewa and Dakotas and the Sioux. Settled largely by French fur traders, missionaries and *coureurs de bois,* it witnessed the fierce struggles between the English and the French in the middle of the eighteenth century, and the rise of the American

A LAND OF TRACKLESS WATERWAYS

All three Lake States can duplicate this river scene, and know the persistent beaver, architect of the wet places, whom persecution has not been able to drive out

UPPER PENINSULA DEVELOPMENT BUREAU

civilization over Indian and Britisher in the early nineteenth. It took to its bosom the great hordes of immigrants—Germans and Scandinavians mainly—gave them its forests, its farmlands and fur, and later saw them pass in large numbers westward in covered wagons to settle the Great Plains. But as romantic as was its early history, perhaps no other episode in the entire pageant of American development has as much color as the "boom days" when the lumberjack was king and the axe and saw whined rip-roaring accompaniment to the mad melody of falling trees and mushrooming towns. From this heyday has come one of the sterling bits of American folk-lore—the "Paul Bunyan" cycle of legends. He of the mighty axe and "Babe the Blue Ox," who measured "three axe handles and a plug of tobacco between the horns," contains the quintessence of this glowing, living era, which meant so much to young America by furnishing the material upon which she was to build.

BUTLER

GATHERING A FAMOUS FOOD

An old squaw follows the habit of endless generations when she reaps the wild rice Nature has sown along the lake shores

They danced in those days, but later generations have to pay the piper, and it is only natural that three states with such recreational possibilities should be forging steadily to the front in forest fire control, reforestation, fish propagation and conservation, the development of state parks and recreational areas, and in many phases of wild life protection. Conservation activities in Michigan are carried on under the Department of Conservation, with headquarters at Lansing. It has proved itself a powerful factor for the good. There are several sportsmen's associations and a state Audubon Society, with an office at Hart. Minnesota's Department of Conservation, and her Game Conservation league have been largely responsible for the rapid strides this state is taking. Wisconsin has a conservation commission of six members who control the fish and game, state parks and forests, and whose purpose is to "provide an adequate and flexible system for the protection, development and use of forests, fish and game, lakes, streams, plant life, flowers and other outdoor resources." Public support will enable it to achieve its goal.

In all three states, the Izaak Walton League, with numerous chapters, and many local organizations and individuals are doing their best to stem the tide of destruction that here, as elsewhere, threatens many of our most attractive forms of wild life. It is significant, too, that thirteen dailies in leading Michigan cities, and many in the other two states, are devoting at least one full feature page each week to outdoor sports, recreation, Nature study and conservation happenings, thus creating a powerful public opinion.

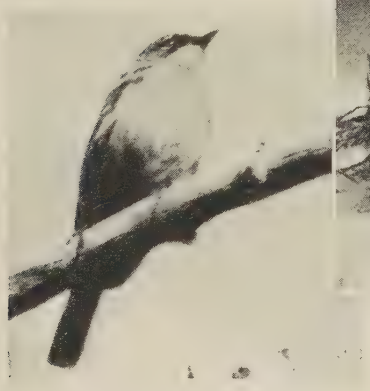
In natural resources, few temperate areas have been blessed more generously than these Lake States. Fur, lumber and fish were the pioneer's for the taking. Yet the first is sadly depleted, though the beaver, whose glossy pelt drew the French voyageurs into this land

(*Continued on page 334*)

AMID THE DUNES IN HOEFT STATE PARK, MICHIGAN

The children are not alone in loving these restless acres that marge the Great Lakes. They indicate the versatility of Lake State scenery

F. RODNEY PAINE



A REAL TRAVELER OF EXTENSIVE RANGE

The Kirtland warbler summers in Michigan pinelands and winters in the Bahamas

WALTER HASTINGS

WALTER HASTINGS

THE SNOWY OWL

A visitor to the Lake States from the Arctic regions of the north

THE HUMMER HAUNTS THE LAKELAND GARDENS

Yet the audacious little fellow may go as far south as Yucatan for the winter

WALTER HASTINGS

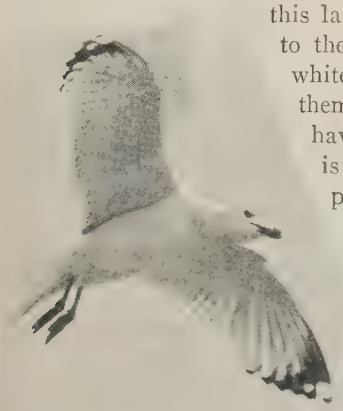
BIRDS *of* HIAWATHA LAND

Here Myriad Migrants Rest on Their Journeys

by Edward A. Preble

EVER since the ice relinquished its long dominion over the land of lakes and pines, known as the Upper Lake States, bird life has prospered. Wild fowl fattened in its teeming rice marshes; the wild pigeon millions had here some of their most populous colonies; and some of our finest upland game birds—the wild turkey, the ruffed grouse, the pinnated grouse or prairie chicken, and the sharp-tailed and spruce grouse—formerly abounded. The grassy prairies invited the migrant hordes of plovers to halt their journeys; and the forests gave shelter and sustenance to a wealth of smaller life. What a bright prospect, gay with feathered life, this land must have presented to the aborigines and to the white pioneers who displaced them. In what manner we have treated this heritage is another, and a darker, picture.

One of the canoe routes of the early traders passed from Lake Superior to the Red River of the North close to the head waters of the Mississippi River. David Thompson, famous explorer of the Northwest Company, while traversing this chain of lakes late in April, 1798, at the time of the spring migration, has thus recorded his impressions of the bird life: "The country everywhere appeared low and level, something like an immense swamp. Everywhere there was much wild rice, upon which the wild fowl fed, and became very fat and well-tasted; the swan was a very rare bird; and of the different species of geese, only two species of the grey goose; but the ducks [were found] in all their varieties; the cranes and bitterns upon their usual food were equally good; of the plover species there were but few, the ponds having their low banks covered with long grass. In some ponds there were pelicans and cormorants."



HERRING GULLS

In summer and winter they soar over the broad waters of the Great Lakes

WALTER HASTINGS

TERN IN FLIGHT

A wide wanderer, the common tern raises its young on sandy northland islands

WALTER HASTINGS

Great river and lake valleys form natural highways for migratory birds, and the lake states occupy a strategic position in respect to the vast and rich country to the north. Birds bound for the great nurseries of Hudson Bay and the deltas of the Mackenzie region must pass through this section on their northward journey from the great wintering grounds in the Gulf States. Who can tell when the spring migration actually starts? It really commences when the winter visitors from the Arctic begin to feel once more the resistless urge to return to their real homes in the Northland, and slip away so quietly that only the most careful observations reveal the time of their going. About the same time, as in the East, comes from the South the bluebird, carrying the sky upon its back, as Thoreau expressed it, and telling to his mate in tenderest tones the old story. With him, or not far behind, appears the robin, scarcely less beloved; and soon the earliest sparrows and one or two warblers arrive. The earliest of the ducks and the wild geese follow the line of the retreating ice, and will crowd hard its margin up to the very Arctic. But to most of us, perhaps spring migration means the warblers, those bits of pulsing color that have come from the far South, some even from Brazil and Peru, and will not pause in their flight until they rest in the willows and alders of the sub-arctic. They have followed the starting leaves and opening flowers with their insect visitors all the way from the tropics. With them, but yet apart, are the shorebirds, late from their distant wintering, haunting the borders of grassy pools or margins of streams. Those that nest in the sub-arctic, like the semi-palmated sandpiper, are the first to pass on, but some, those that must wait until the very hem of the uttermost northern lands is clear of ice, like the turnstone, sanderling, and golden plover, delay their going even until June. Scarce have they gone when the vanguard of the autumnal flocking comes back; first the non-breeders or those that have lost their nests, and later the young and their parents. Many of these sandpipers pass the time of our winter in the summer of the southern hemisphere, on the pampas of Paraguay and Argentina, and these know no season of cold.

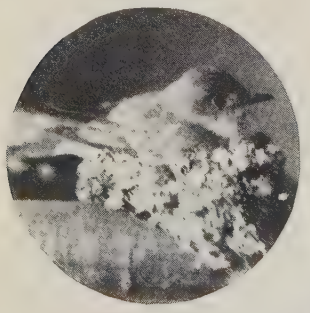
A. O. GROSS AND WIS. CON. COMM.

IT MAY BE SAVED

The prairie chicken of the Lake States, a relative of the vanished heath hen, still carries on

In the meantime a wealth of bird life passes the season of reproduction in this favored land. Many small birds of the Southland find their northernmost homes in the low valleys of the Mississippi drainage. Birds of many groups—warblers, sparrows, flycatchers, vireos, jays, orioles, and others—have each their appointed place. There are birds of prey, also, those checks that Nature has put on the smaller birds and mammals, which without some deterrent force would soon overrun the earth. All these are of interest and delight to millions of residents and visitors. Such southern species as the man-o'-war bird, the wood ibis, and the snowy and little blue herons, wanderers after the close of the breeding season, have been observed here in summer. The beautiful Carolina paroquet, now extinct, was formerly an occasional visitor.

One of the most notable of the small summer birds is Kirtland's warbler. The first known specimen was taken at sea near the Bahama Islands about the year 1840. In 1851, near Cleveland, Ohio, a second specimen was collected, and from this the species was described. A few others were subsequently taken in various parts of the eastern states, but it was not until 1903, more than fifty



ALFRED O. GROSS

A WOOD PEWEE

On the limb of some forest monarch she fashions her lichen-shrouded cradle

TEN THOUSAND LAKES—GREATER MINN. ASS'N

OUT FOR A STROLL

The ruffed grouse grows snòw-shoes in the winter and knows how to use them

ALFRED O. GROSS

NEARLY READY TO FLY AND MAKE HIS OWN LIVING

A spotted sandpiper, denizen of Lake States shorelines, rests from his beach-combing activities to pose calmly for a portrait

ALFRED O. GROSS

THE HERMIT THRUSH

One of the sweetest of the lakeland singers, it favors the quiet piney woods

WALTER HASTINGS

A LAKE STATES VISITOR

This greater yellowlegs pauses on his way to subarctic marshes

ALFRED O. GROSS

NO END OF CLAMOR

A cedar-bird mother with such a family knows few idle moments in her life

years after the bird was discovered, that its nesting grounds were found to be in the pine woods of northern Michigan, and its winter home in the Bahamas. Another bird worthy of special notice is the evening grosbeak. Though it was first discovered near Sault Ste. Marie, Michigan, by the explorer and ethnologist Schoolcraft, in 1823, the birds that were occasionally seen in this region were supposed to be only winter visitors from the Rocky Mountain region. A few years ago, however, it was found to be a rather frequent breeder in the pine woods of the Upper Peninsula. The bird occasionally comes east to eastern Canada and New England, and has been seen as far south as Iowa, Kentucky, Indiana, and the District of Columbia.

In August and September most of the small migratory birds come back from the North with their young, and with those that have bred in this section leave for their respective winter homes in the southern states or the tropics. Then comes the winter, the season of hunger and stress. All but the hardiest of the small birds, those that can subsist on seeds or dormant insects, move south, but the chickadees, nuthatches, woodpeckers, and some others whose food habits permit, stay and brave the cold. From the North come the golden-crowned kinglets of the pines, the redpolls that seem never to tire of searching out the tiny seeds of the birches, and those birds of the level places, the snow bunting or snowflake, always in tireless flocks that sweep from field to field in search of a weed-patch not yet ravaged, and its cousin of similar tastes, the Lapland longspur. These lovers of the waste lands usually grow fat on the seeds of noxious weeds, fare that man can most easily spare. Occasionally a blizzard of unusual severity proves too much for even their hardy blood, and they perish by thousands. Sometimes violent storms overtake the small bird migrants crossing Lake Michigan or Lake Huron and sweep to their death many thousands, perhaps millions. Remembrance of such tragedies should make it doubly incumbent upon man to protect his wild friends and allies.

Many larger birds also visit the western lake states in winter. Among them may be mentioned the American and king eiders, and several other hardy ducks—golden-eyes, scaups, and scoters—which, with the oldsquaw, frequent the open waters of the Great Lakes. The glaucous gulls, with some of the herring gulls, and the common and red-throated loons, are also found wherever the lakes remain open. The beautiful snowy owl, when forced south by the scarcity of lemmings and hares in its Arctic hunting grounds, may become common. At such times come also the northern form of the great horned owl, and sometimes the hawk owl and the great gray owl. The goshawk is even more frequent, and when it comes may ravage the grouse, and mayhap the domestic fowls of the farmer. Thus does Nature round out her year.

The returns from banded birds show that many of the birds of the Lake States are far travelers. Herring gulls banded on Lake Michigan have been recovered near the mouth of the St. Lawrence River, in Labrador, Newfoundland, New Brunswick, Nova Scotia, and in central Mexico. A great blue heron from Minnesota was recovered on Gatun Lake, Canal Zone.

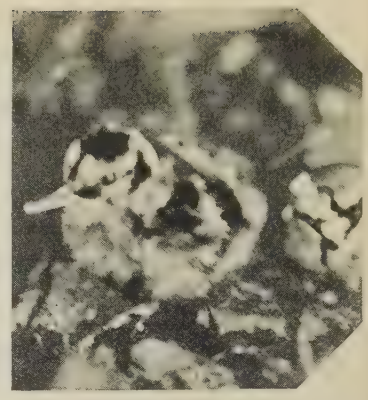
IN FLIGHT ABOUT ISLE ROYALE

Here in northern Michigan the herring gulls wheel and scream with none to molest them

WALTER HASTINGS

MOTHER WOODCOCK
She patiently broods on her quartet of eggs in a marshy thicket

ALFRED O. GROSS



AND HER REWARD
This still damp infant, whose bright eyes sparkle, is her pay

A Caspian tern from Lake Michigan, banded in 1923, was taken the next year in Nova Scotia. This bird must have gone south, wintered at some point unknown, and in spring worked its way north again. Other Caspian terns from the same place went to Colombia, South America, and to Cuba. A band put on a robin in Minnesota was recovered from the southern end of the Mexican tableland, where the bird had gone for the winter.

The Lake States form a sort of focusing point of several great migration routes, and this has resulted in a few instances in the detection of birds of European origin, these presumably individuals that have reached America by way of Iceland and Greenland and have accompanied the southward migrating flocks of our own species. Among such are the curlew sandpiper, the European woodcock, the ruff, and the masked duck.

WALTER HASTINGS

BACK TO HER EGGS
The beautiful common tern gives a final stretch to her wings before settling down to brood

What may one say, in few words, about some of the more notable species of the Lake States? The beautiful passenger pigeon, now extinct, was one of the most abundant of birds. Some of the great nesting areas are thought to have harbored millions, and the birds were slaughtered, especially in these places, by every conceivable method. Often they were fed to hogs, and many thousands were even shipped alive to be shot from traps. Shipments estimated to include a million and a half of birds were sent to market in the summer of 1878. Yet some people still attribute the extinction of the passenger pigeon to disease, or to some unknown catastrophe. Our most eminent authority, Mershon, however, lays the blame on the net and gun.

There still exist in the Lake States (and formerly they were all abundant), three large birds, each as beautiful and wonderful as the wild pigeon. These are the woodcock, the pinnated grouse or prairie chicken, and the ruffed grouse. They are all birds that have been designated as game, and as such, each is in grave danger. Formerly very abundant, the woodcock is considered by many to be rapidly declining in numbers in the Mississippi valley, and to a lesser extent throughout its range. Its decline in the Middle West is probably due to excessive shooting in Louisiana and other southern states, where it winters. Let us glance at the history of the legislation in force in its favor during the past ten years. In Michigan, the woodcock has had an annual open season ranging as follows: Nearly two months in 1920; reduced to five weeks, 1921-1924; further reduced to one week, 1925-1928; but increased to about two weeks in 1929. Minnesota, believing either that it had more woodcock,

(*Continued on page 334*)

CASPIAN TERNS
These youngsters, whose family ranges far, greet the rising sun from some Lake States shore
WALTER HASTINGS

MINN. ARROWHEAD ASSOCIATION

WHERE PEACE AND BEAUTY REIGN

Lake Susan, one of Minnesota's ten thousand lakes, offers the camper his heart's desire

LAND *of the* SKY-BLUE WATER

Measuring the Charm of Twenty Thousand Lakes

by Alfred D. Stedman

ONCE I watched evening steal upon a favorite corner of the lake country of Northern Wisconsin from a lovely pine-sheltered shore.

Twilight lingered, as if loath to depart, prolonging the witchery of transition from day to night. Quiet possessed the world. Born of the light zephyrs that followed the rougher breezes of the day, gentle ripples provided myriad mirrors for the tints of fading day. The sun's last rays, gilding the fleecy clouds overhead; the illumined pale green tops of trees on the hill that crowned a distant shore; the purple velvety gloom gathering about my shaded cloister—all these things were reflected in a limpid blend of infinitely changing and slowly darkening colors.

MICH. DEPT. OF CONSERVATION

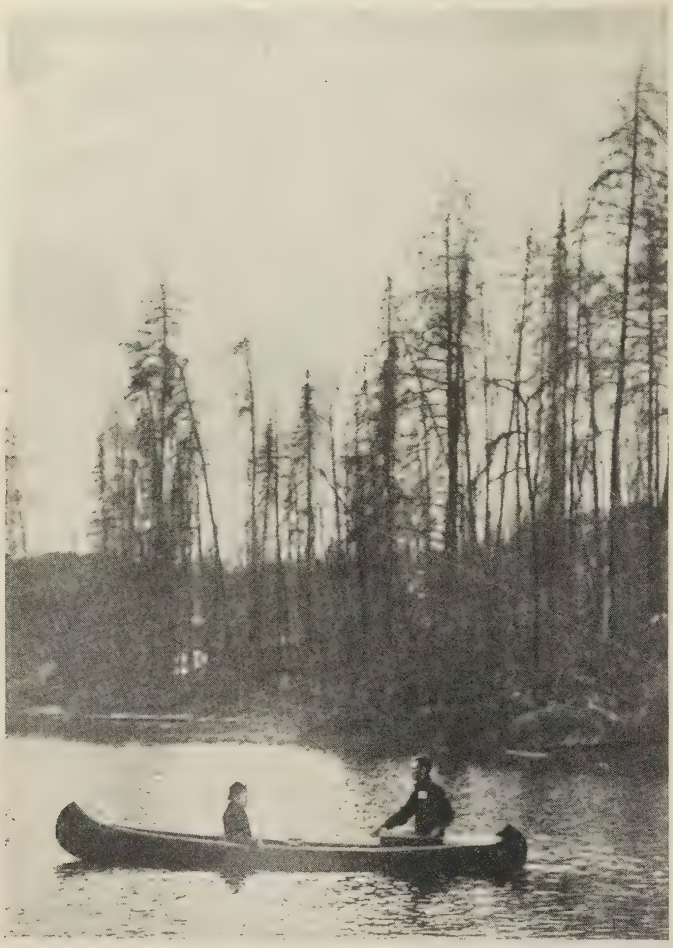
CHAPEL ROCKS ON SUPERIOR

Part of the famous Pictured Rocks of which Michigan can boast

My lovely little body of water, a mere widening of a stream, was not blessed with a name. It joined, however, to a parent called Little Yellow Lake, a round pearl in a green hill setting, and beyond that, a low shelf of sand sparsely covered with trees and pierced by the river formed the only barrier to Big Yellow Lake. And farther on. . . .

"Farther on!" That is the hymn of the lake country, just as it was the hymn of the missionaries and the voyageurs who saw it when it still was virgin. Farther on—what new and more lovely waterscape? Beyond the next portage, around the next turn, what pools or falls or rapids?

My Yellow Lakes are no oases in an arid land. They are merely one series among



ON THE TRAIL OF THE MOON
Countless numbers here seek the health and rest that quiet waters bring
DULUTH CHAMBER OF COMMERCE

many. On all sides of them, in every direction, lie more and still more lakes, draining into distant rivers; more rugged shores; other waved-marked beaches.

Northward a few miles, matchless Superior lures with the glamor of mighty waters, as it lured French explorers a hundred years ago, and around her southern shores cuddle the innumerable lakes of northern Wisconsin. To the East lies Michigan, bisected by water into two peninsulas, with two thousand miles of lake shore and uncounted waters in the interior. Westward is Minnesota, the state of Ten Thousand Lakes, the land of "sky-tinted water," as the Dakota language named it. It is not strange that these three states are called the lake states. Perhaps they might better be called the birthplace of waters, for they father the Father of Waters himself when he is but a trickle, and feed the sources of two other great river systems, the St. Lawrence and the Red River of the North, feeders for the Atlantic and Hudson Bay.

Those who now camp on the piney shores, seeking in these quiet places rest for nerves frayed by the turmoil of modern high speed living, are enjoying a gift of the glaciers of long ago. The slow and stately southward march of these mighty ice masses sculptured the face of Nature into new and untried formations. Their tremendous power planed down hills, excavated valleys and, damming rivers, turned their courses this way and that, first toward one sea and then to another, as a boy traces new outlets from puddles with his toe. The glaciers melted and retreated, leaving the hollows of their making filled with water, and the northward march of vegetation was resumed until the country was again abloom. Thus for tens of thousands of years the forces of Nature worked, draining some lakes, filling others, creating new rivers, touching up the face of creation with verdure. As at the junctures of the St. Croix and Chippewa rivers with the Mississippi, where Lakes St. Croix and Pepin were created, streams sometimes dammed one another with their silt and extended the lake region beyond the glaciated country, working and reworking this land of the sky-blue water.

In all three states the shore lines of vanished inland seas are visible. Close by the deepest and largest bodies of water are dry bottoms, muskeg swamps and meadows, marking the steps by which ancient lakes were caused to disappear. And the processions of tamarack, spruce and cedar can be seen encroaching slowly on still vigorous waters, taking possession they will never relinquish as decaying vegetation in the shallows provides a foothold for their roots.

For there is nothing eternally changeless about this country. It is far from static, as are the prairies that still sleep as they have slept for immeasurable aeons. It has no affinity to the seas, which are old in the age of

NOW FOR THE PORTAGE
One can travel for thousands of miles in canoe, with but short carries now and then
DULUTH CHAMBER OF COMMERCE

WHY PEOPLE GO TO MINNESOTA
Lac La Croix, island-studded, is a favorite retreat of camper and canoeist
MINNESOTA ARROWHEAD ASSOCIATION

the world. Upon the surface of this undulating region are inscribed everywhere the evidences that Nature's story is in the telling and has not yet all been told, and never may be, until another ice-age comes.

Claiming ten thousand lakes and having more than five thousand of sufficient size to appear on the official maps, Minnesota leads all other states in expanse of water area. Its lake and river surface totals 3,824 square miles. Red Lake, with an area of nearly five hundred square miles is largest, followed by Leech and Cass.

Wisconsin's finest lake regions are three, in the northwest, northeast and southeast sections. The whole eastern part is well watered and northern Wisconsin alone has two thousand lakes. Green Lake, Winnebago and the Four Lakes of Madison are among the most famous.

Few places in the world have so large a share of lake surface as the Upper Peninsula of Michigan. Bordered by four of the five Great Lakes, Michigan has in proportion to area the greatest extent of water boundary line of any state. Among the hundreds of fine lakes resting in its rugged country are Michigamme, Gogebic and Manistique. The inland water area of Michigan totals more than five hundred square miles, while that of Wisconsin is eight hundred and ten.

When Allonez, Marquette and Sieur du Luth beheld the hills richly garmented in forests and waters abounding in game and fish, they understood why the Indians had fought among themselves for possession of the country, why the Chippewa and Sioux had waged their endless warfare.

The Sioux was lord of the region when the white men came. The water courses were his highways. The whole territory was a network of ancient canoe trails. The explorers and *coureurs de bois* soon learned that the headwaters of a river or the end of a lake was not the terminus of a route, but merely the beginning of a portage to a nearby stream.

With net and spear the redman took muskellunge and trout that still lure the sportsmen with line and rod. He crept up on the moose, feeding among the lilies. In the rice beds over the muskeg, he shot down waterfowl with bow and arrow.

The lakes he invested with mysterious attributes. Sensing life pulsing in them and about them, the Indian consulted the poesy of his soul. He brooded upon the circumstance that the lakes sometimes seemed obsessed. He noted that the winds, passing over their bosoms, awakened in them untamed and malicious passions. But the smiles of heaven also were reflected. Their movements under gentle breezes sounded to the aborigine like laughter and sweet music. They echoed the moody voices of the night. So to him the lakes became the dwelling places of spirits. He wove about them a fabric of legend and gave them names as

(*Continued on page 335*)

WHAT MORE THAN THIS?
A lake, and trees, and rolling hills curling up beyond
A. E. YOUNG

MINNEAPOLIS CIVIC & COMMERCE ASS'N

(Left) Where the lovely Minnehaha Falls, most famous of Minnesota's laughing waters, tumble and leap into the valley below

TEN THOUSAND LAKES—GREATER MINNESOTA ASS'N

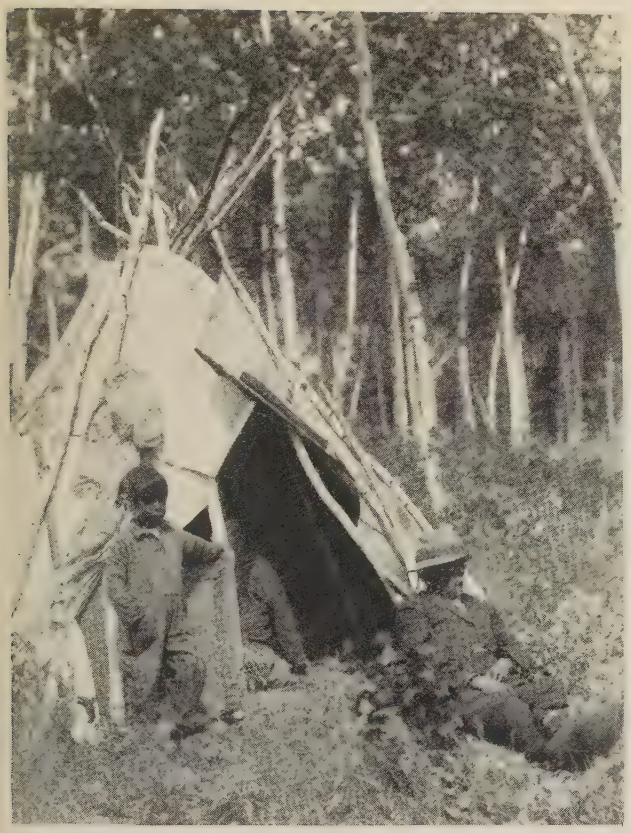
Lake State mammal contrasts—a chipmunk poses on an antler shed by a mighty moose. Below, Père Marquette gazes out over Lake Superior from his bluff near Marquette, Michigan

E. A. HYER

BUTLER

(Below) Two types of Wisconsin scenery —a quiet, sunlit dell, at the left, and the rugged stretches of crag, water and forest embraced by the famous Devil's Lake State Park

F. RODNEY PAINE



(Left) Indians find amid the timber of the Superior National Forest, in Minnesota, a remnant of the wild life of former days

F. RODNEY PAINE

(Right) The North Star State also harbors the lordly moose, as this evening scene in the Arrowhead country testifies

DULUTH CHAMBER OF COMMERCE

(Below) Copper Falls, near Mellen, is but one of many beauty spots found in Wisconsin

(Left) Not scared but wobbly is this little fawn who represents the most popular mammal family in the Lake States

WIS. CON. COMM. AND A. O. GROSS

(Below) The beautifully sculptured Pictured Rocks of Michigan rise from Superior's clear waters in graceful majesty

BEN EAST

BUTLER

MAMMALS *of*

The New Day of Conservation Heralds Their Increase

TEN THOUSAND LAKES—GREATER MINNESOTA ASS'N

WALTER HASTINGS

THE FAVORITE AND THE SHUNNED

The white-tailed deer is the most popular Lake States mammal, but the skunk has few real friends

THE Upper Lakes States, Michigan, Wisconsin, and Minnesota comprise an area of seven hundred miles in width and five hundred miles in length, encompassing one of the Great Lakes, marking on their shore lines the entire United States boundaries of two others and a part of a fourth, and containing in addition the upper reaches of the Mississippi Valley. The land is one moulded by glaciers, lined and dotted with moraines and embracing more than twenty thousand lakes which recorded the ice sheet's passing.

So varied a land might well, and does, possess a diversified flora and fauna. Its contrasts are more understandable when one considers that the southern parts of these states are partially within the upper Austral, their middle lands in the Transition, and the northern areas in the Canadian life zones.

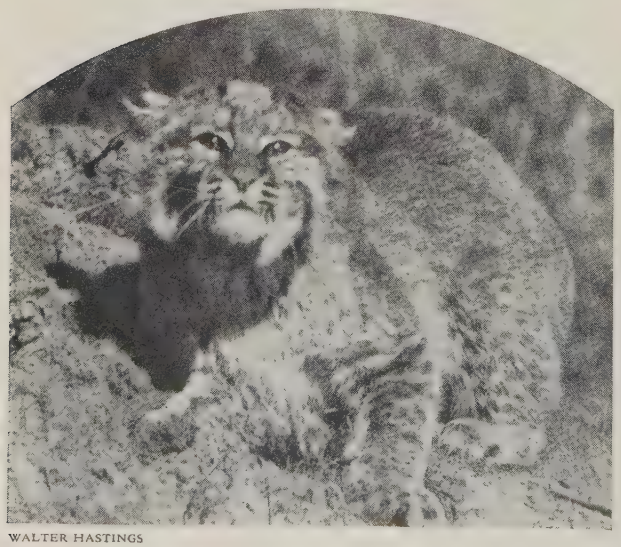
HASTINGS

UP A TREE FOR FAIR IS THIS 'COON

But only temporarily. Below the bob-cat advises that the photographer beat a retreat

Upon the widely divergent topographical, geographical, and climatic features of these states have been imposed the floral and subsequent faunal changes brought about by the intensive settling and industrialization of large areas, and so in sketching the natural features or resources of these states one is conscious of two pictures. The first presents the primeval condition of several centuries ago, when a balanced, co-ordinated floral and faunal life existed; the other is that of the disorganized landscape brought about by wholesale deforestation, agricultural development, and the advent of manufacturing industries. . . . And yet, there is still a third picture, possibly the most stable of the three, which is now forming, taking on life and color amidst the geometrical pattern of prosperous farmlands and the once charred and blackened "plains" of the north country, where for years the axe bit deep and fire bit deeper. The Artist at work on this third picture is a quiet but powerful influence. . . . Men call it Conservation. . . . The Prophets would have called it Wisdom.

The student of ecology will find much to interest him and to test his genius in the faunal changes which have followed the forest harvest-holocaust. The great pines no longer strum to the urge of Superior's winds

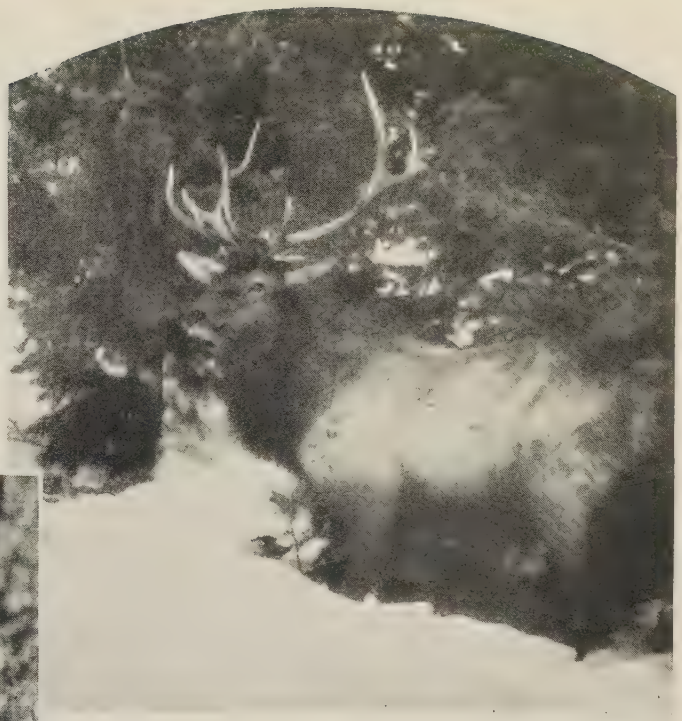


WALTER HASTINGS

the LAKE STATES

by Edward Allan Hyer

Michigan Department of Conservation



B. L. BROWN

WALTER HASTINGS

THE ELK IS WELL PROTECTED

Which cannot be said of the digger of burrows, the woodchuck

present herd, numbering approximately one hundred animals, has the freedom of the Pigeon River State Forest in Otsego, Cheboygan, and Montmorency counties, where full legal protection is afforded it. The fact that a part of this forest is set aside as a game refuge, constantly patrolled, in which no hunting is allowed at any time, has doubtless had much to do with the increase of this animal in Michigan.

The woodland caribou, in the days of the timber, roamed from northern Minnesota eastward along Superior's shore line through Wisconsin and the upper peninsula of Michigan, and possibly on the islands in northern Lake Michigan. Today a remnant may still be found sparingly in northern Minnesota.

nor shower glistening beads of water, fog-born, to the mossy cushion below. Nature is experimenting in this land; never idle, never asking yet never refusing help, she is seeding, and she stocks with what is nearest at hand, healing always.

The mammals of this region range in size from the lordly moose with antlers "as wide as Hiawatha's bow" to the smallest of earth's warm-blooded creatures, the shrews.

WALTER HASTINGS

"THAT FOR ALL OF YOU"

The black bear registers contempt. In the Lake States, the opossum, below, finds his northernmost range

He of the prehensile tail, the only one north of the Rio Grande and our only marsupial, the opossum, finds the northern limits of his range in southern Wisconsin and Michigan. Of late he seems to have gained a stronger hold in the farm lands of the lower tier of counties in southern Michigan.

The American bison formerly ranged over the prairie areas of southern Michigan, southern and central Wisconsin and western Minnesota. But as it passed, so passed the prong-horned antelope, formerly denizen of southwestern Minnesota, and the great herds of the American elk, which once roamed the length and breadth of this territory and is still native to a small area surrounding the Manitoba-Ontario-Minnesota boundary lines. The antelope never came back, but the wapiti was re-introduced into the northern part of the lower peninsula of Michigan in 1917 and seems to thrive. The

WALTER HASTINGS

WALTER HASTINGS

THIRTEEN-LINED SPERMOPHILE

Native of southern Minnesota and Wisconsin

THE CRAFTY PLAINS YELPER

In the ascendant numerically is the coyote in the Lake States

WALTER HASTINGS

"ANY NUT WILL DO FOR ME"

Chatters the fox squirrel of the southern sections of the land o' lakes. He is but one of the many hundreds of interesting smaller mammals making their home in the forests of this section

There is one animal, however, that despite farm, factory, and open season has managed to hold its own over much of this territory and is today the most common of the larger mammals found there. This is the white-tailed deer. True, it has been driven from the southern and thickly-settled parts of these states, but wherever given protection—and of late years many of the central and southern counties have offered it sanctuary—it has survived where sufficient summer cover and winter food existed. In certain portions of these states where the "tourist" business has become quite an industry, it enjoys a year round amnesty, and there one may see it scampering from the roadside at the approach of an automobile.

Isle Royale, an isolated island in northern Lake Superior, devoid of human inhabitants during the winter months, is the home of a large moose herd, numbering probably two thousand. This spot constitutes the most thickly moose-populated area in the world and long protection has increased this herd to numbers that must soon tax the capacities of the island. Formerly the moose ranged the forested areas of the northern parts of the three states, and even today it browses among the willow groves and lily pads along northeastern Minnesota and sometimes northeastern Wisconsin lakes and streams. Scattered localities in the upper peninsula of Michigan boast, too, of its presence. A decided migration from Ontario seems to be taking place westward across the St. Mary's River into the eastern part of Michigan's upper peninsula.

KING OF THEM ALL

This Isle Royale moose represents the largest mammal of the north

WALTER HASTINGS

Eighteen carnivorous mammals were native to the Upper Lake States territory. The puma went west; the wolverene, largest member of the weasel family, is no longer found in the eastern part of this region and rarely if at all in the western, and the long-legged Canada lynx has passed, or is passing, before the trapper. The only prominent member of the cat family to remain is the persistent bobcat, which formerly sought its bird and mammal prey over the entire range, but is now restricted to the less settled areas particularly in the northern portions.

Despite traps and guns, the gray or timber wolf, that once stalked the streets of frontier towns on winter nights, and dragged down the enfeebled buffalo on the plains, still persists in the hinterlands where roads are few and travel infrequent, and his lesser relative of the open spaces, the crafty coyote, is actually on the ascent numerically of late years. With the passing of the timber, the "plains" which took its place seem to afford excellent cover for the yelper and his brood. The third member of the family, the red fox, he of the brushy tail and valuable fur, has also so successfully pitted his cunning against civilization as to remain fairly numerous over the northern parts of the three states, and even in the central and southern areas. A southern cousin, the gray fox, hunts over the lower section, but is quite rare. That well-known quadruped, the black bear, one of the shyest of animals in this region, is abundant in the northern portions, although few see him.

The fate of the furbearers has been fraught with tragedy throughout Minnesota, Wisconsin and Michigan. First the Indians, then the *coureurs de bois,* then the settlers, eking out a slim existence, demanded their toll of wild life, and before they had finished, the marten, fisher, and others had virtually disappeared. The silken-furred otter, however, while rare, still occurs in all suitable localities, and the courageous mink and weasel manage to hold out against every change. Bonaparte's weasel, found mainly in the northern sections, and the larger species, *Mustela noveboracensis* in the southern areas, are helping to rid the

(*Continued on page 340*)

THE WATER LILY GRACES THE PONDS

It is quite common over the entire region along the marges of shallow lakes

WALTER HASTINGS

L. W. BROWNELL

(Left) FRINGED GENTIAN OF THE FALL

It is rapidly growing more rare. The long-fruited anemone, below, is equally demure

JACK VAN COEVERING

WILDINGS OF THE LAND OF LAKES

They Add their Quota to the Northland's Charms

By Arthur Monrad Johnson

University of California at Los Angeles

THE FLORA of the Great Lakes region differs little in its larger aspects from that of New England, the North-Atlantic states, and the St. Lawrence Basin. Certain plants reach here their most northerly and westerly limits, such as the papaw, *Asimina triloba,* the tulip tree, *Liriodendron tulipifera,* and the May apple or mandrake, *Podophyllum peltatum.* On the sand dunes of Lake Michigan are certain relict elements of the Atlantic coastal plain, and on rocky promontories and in cold bogs and swamps, certain rare boreal forms persist. Some far western elements appear to have been isolated here and there,—among the strangest of which is the devil's club, *Echinopanax horridum,* a very prickly shrub found on Isle Royale in Lake Superior hundreds of miles from its western home. In the deep forests bordering Lake Superior, from Michigan to Minnesota and western Ontario, one will find the showy-flowered salmon berry, *Rubus parviflorus,* whose typical habitat is in the mountain forests of the far West. Here and there occurs the Arctic black crowberry, *Empetrum nigrum,* and in peat bogs and low deep woods the Arctic dewberry, *Rubus arcticus,* is fairly common. These few examples will illustrate the wide variety of the Lake States' wealth in floral adornment.

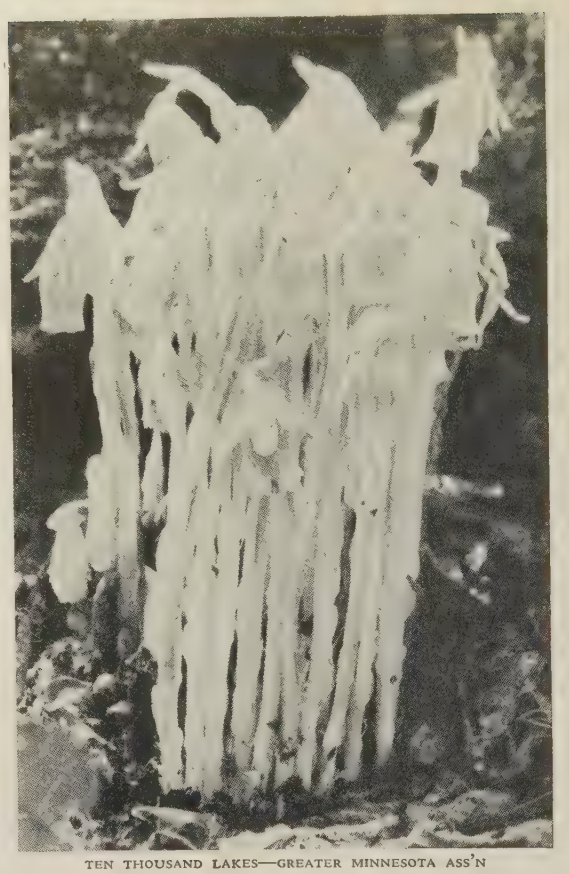
JACK VAN COEVERING

CACTUS OF MICHIGAN

The dry places of the Wolverene State know this plant as well as do the Western plains

In many outlying localities, safe from the honking intruder, lovely and rare flowers are still persisting, but one trembles for their fate. Shall we learn in time that forty acres of tamarack and spruce swamp adjoining a city may be more valuable for what it contains than if it were subdivided for development purposes? Is a corner grocery of more value in stimulating love of country than green spruces, rare orchids, and decoying pitcher plants?

There is little left now of the virgin prairie with its gay seasonal bloom. Yet many of the wild flowers that once carpeted it in profusion still maintain themselves, more or less precariously, on railway rights of way, along roadsides and fence rows, and in scattering pastures. The hairy-coated pasque-flower, *Anemone patens,* opens its large purplish flowers each spring, as vigorous as ever, on many a grassy knoll, and the beautiful prairie violet, *Viola pedatifida,* with leaves shaped into thin segments, is not far behind. May brings the modest star-grass, one of the few native cousins of the amaryllis. It is so grass-like in appearance that were it not for its yellow star-shaped flowers, its presence would not be suspected. One or two of the blue-eyed grasses may be found here at the same time. These, too, have somewhat grass-like leaves, but they claim kinship with the irises, although there is little superficial resemblance to their cousin in their small, bluish star-shaped flowers.



TEN THOUSAND LAKES—GREATER MINNESOTA ASS'N

A BEAUTY OF AUGUST

When it suddenly springs from the rich leaf mold, the Indian pipe is worth a day's journey to see

By haying time the prairies and low hills take on the hues of a richly painted canvas. Red lilies add bright orange-red splashes to the woodland color-scheme. The glowing yellow of the black-eyed susans mingles with the blue of rocketing clusters of blazing stars, *Liatris,* and the deeper, richer blue of the lead plant, *Amorpha canescens,* while with every soft breeze comes the sweet fragrance of the prairie clovers, *Petalostemum purpureum* and *P. candidum.*

The lowly aspen usually has not been held in high esteem, but to the pioneers of the northwestern praires it gave shelter and fuel. Nowadays it interests us particularly because it often shelters such choice herbs as the yellow lady-slipper, the orange-flowered puccoon, the aromatic horse-mint, the brilliantly scarlet Indian paint-brush, and the wild geranium. Above them all may often be seen the white spikes of the Culver's root, *Veronica virginica,* and down among the grasses the lousewort, and the slender white clusters of the snake-root, *Polygala polygama.* In the early days this snake-root was gathered by the Chippewa Indians and sold to drug dealers. All the way across country eastward the white wind-flower, *Anemone canadensis,* is abundant, especially along railways and roadsides. In autumn many sunflowers, asters, and goldenrods make colorful hedges along the highways. A little earlier in the season one notes patches of the fragrant dogbanes, *Apocynum,* and

DENIZEN OF THE DEEPER GLENS

A rare find is the small purple-fringed orchis

L. W. BROWNELL

AN EXQUISITE NORTHLAND BLOOM

The American lotus is at home in the shallow ponds

JACK VAN COEVERING

NESTLING ON THE WOODLAND CARPET

Trilliums seek the protection of a fallen burnt log

JACK VAN COEVERING

CATTAILS OF THE LOWLAND SWAMPS

The Lake States know well their erect forms springing from marshes

WALTER HASTINGS

many showy milkweeds, their more robust relatives.

The deciduous woodlands are especially rich in wild flowers. To these we go in spring to find trilliums, the dogtooth violet, or trout-lily, *Erythronium,* rue anemone, *Syndesmon,* the false rue-anemone, *Isopyrum biternatum,* hepatica, bloodroot, skunk cabbage, violets—white, blue, and yellow—Jack-in-the-pulpit, and many others familiar to us from our childhood days. Bloodroot and skunk cabbage are two of the first to appear. If we are fortunate we may chance to find, some time in May, the lowly and strange musk-root, *Adoxa moschatellina,* whose kinship no one knows precisely, and which seems to have established itself about the northern hemisphere wherever it finds suitable habitat. Its small greenish flowers suggest a saxifrage while its leaves are somewhat like those of a buttercup. The bellworts, Solomon's seal, twisted-stalk, false Solomon's seal and several species of *Smilax,* are quite common from spring to summer. By this time or a little later we shall find, also, the white- and the red-berried baneberries, *Actaea alba* and *A. rubra.*

In low wet places the marsh marigold, *Caltha palustris,* is usually abundant. To the wealth of showy-flowered herbs should be added the many "flowering" shrubs occurring in these woodlands. Springtime would lose much of its charm were it not for the plums, cherries, service-berries, nanny-haws, hawthorns, *Crataegus,* wild apples, currants and gooseberries, dogwoods, and many others, whose blossoms scent the air and give promise of a rich harvest of luscious fruit. These woodlands hold an enviable reputation for the abundance of their wild fruits and nuts. Nutting, cherry-picking and plum-picking, are occasions looked forward to with lively anticipation, by both young and old alike.

In the pine regions of Michigan, Minnesota, Wisconsin, and western Ontario, where many people spend their summer vacations, the vegetation is as varied as the topography. A few hours' travel by automobile will unroll a shifting panorama of high rocky hills, sandy plains, deep ravines, dark pine forests, muskegs of spruce and tamarack, and open peat-bogs, deep cedar swamps, lakes and streams, one after the other, each with its distinctive flora. Here grow some of the loveliest of the flowering plants, often far from frequented roads and trails. In order to appreciate fully what this region has to offer in the way of wild flowers, one's observations should begin with the earliest spring and continue until the leaves fall.

SHOWY LADY SLIPPER

No plant of the North has more subtle charm than deep wood's lover

WALTER HASTINGS

Choicest of the early flowers is the trailing arbutus, *Epigaea repens.* Few others of its kin among the heaths can match it for beauty and fragrance. Fortunately for its preservation it is so inconspicuous in summer, trailing beneath the herbage, that it escapes detection. If one sees the blueberry ridges at berrying time, it requires little stretch of the imagination to visualize these favorite heaths at blossom time. But these do not complete the gamut of heaths. A tamarack or spruce swamp, or "muskeg", is a forbidding terrain in summer, giving little hint of the masses of bloom that cover

(*Continued on page 334*)

Lake of the Woods
Canada Goose
Rainy Lake
Rainy River
Minnesota
Otter
Canadian National Railways
Caribou
Moose
Port Arthur
Can. Pac.
St. William
Isle Royale (to Mich.)
International Falls
Bear
Loon
Red Lake
400 sq. m.
Ghost of whooping crane
Timber still available
Vermilion Lake
Old Bed of Lake Agassiz
Red River
Grand Forks
Crookston
Hibbing
Chisholm
Virginia
Eveleth
The Great Iron Belt
Return cargo of coal
2,555.25 m. Lake Itasca to the Gulf
Wolf going shopping in town
Two Harbors
Ore loaded for eastern Lake ports
Apostle Islands
Little Girl Point
Gogebic Lake
Morrison and Schoolcraft discover sources of the Mississippi 1832
Leech L.
200 sq. m.
Harvesting
Duluth
Grain
Hermit Thrush
Moorhead
Redstart
Portage (to the Red River)
Fargo
"North Coast Limited"
Great Northern
Mississippi R.
Cloquet
Beans
Jerrus Falls Power
Otter Tail Lake
Brainerd
Superior
Mich.
Wisc.
Portages
Ashland
Iron
Mille Lacs
Lindbergh grew up here
Little Falls
Driving Logs
St. Croix River
Former haunt of sandhill crane
Forest fire and cooked goose
Northern Pacific
"Empire Builder"
Lake Traverse
Father Hennepin 1680
"Wisconsin the leading lumber state, 1900-05"
Muskellunge
Short and popular portage in early days
St. Cloud Granite
Stillwater Lumber
Spring water
Chippewa Falls Power
Merrill Lumber
Wausau
Big Stone Lake
Migrating ducks
Minneapolis
Twin Cities
St. Paul
J. J. Hill
Minnehaha Falls
Lac qui Parle
Eau Claire Lumber
Chippewa
Dakotas under Chief Little Crow on rampage, 1862
C. M. & St. P. "Olympian"
St. Snelling
A. Dubin
Red Wing
Ruffed Grouse
Lady slipper
Minnesota River
Wheat
Jaribault
Sleepy Eye
New Ulm
Mankato
Leading dairying state in U.S.
Pipestone
C. & N. W.
Rochester
Winona
La Crosse
Limestone Butter
Big Butter & Egg man
Gopher surveying his domain
Caitlin, artist, painted here a century ago
Albert Lea
Austin
Minnesota
Prairie du Chien
Early trading & military post
Wisconsin River
Sioux Falls
Franklin's Gulls
Prairie Chicken
Cheese Butter
Lead & Zinc mines
"Elephant" Indian Mound
Black Hawk War 1832
Sioux City
Missouri River
Dubuque
Galena
1860 U.S. Grant clerk in a leather store
1869
Clinton
Missis-sippi River
Where the tall corn grows

Lake Superior
602 FT. ABOVE SEA LEVEL
World's most productive copper mines
OPEN PIT
KEWEENAW
CALUMET
LAURIUM
HANCOCK
Portage Lake & Canal
Sturgeon
The SAULT Ste MARIES each nation has one
MARQUETTE
Pictured Rocks
NEGAUNEE
ISHPEMING
Iron
Beaver
Riding to hounds
20th century Hiawatha
Snipe
North Channel
Georgian Bay
MANITOULIN Id.
Straits of Mackinac
MACKINAC Id.
BOIS BLANC Id.
BEAVER Id.
CHEBOYGAN
Lake Huron
581 FEET ABOVE SEA LEVEL
ESCANABA
Cal C's vacation 1928
Jean Nicolet looking for China 1634
ALPENA
Cement
Husband teaching wife to cook
Grand Traverse Bay
Lynx (NOT THE GOLPH SPECIES)
MENOMINEE
MARINETTE
Lumber
N.W. Cooling Winds
Spuds
TRAVERSE CITY
Au Sable River
Winter Sports
Whitefish
Sledge hauling in winter
Woodcock
Saginaw Bay
World's leading fresh water fish market
Fruits
GREEN BAY
Michigan the leading lumber state 1870-90
Trained Trout
Regular route of old Montreal fur traders
MANISTEE
OSHKOSH
Lake Winnebago
Fox R.
LUDINGTON
Hay
BAD AXE
BAY CITY
Peaches
Land of the beautiful milk maids
SAGINAW
Led U.S. till 1893
Coal
Salt
FOND DU LAC
SHEBOYGAN
Furniture
PORTAGE
Old Bob
MADISON
"on Wisconsin"
MUSKEGON
Lumber
Sheep
OWOSSO
PORT HURON
Beans
FLINT
PONTIAC
Wheat
MILWAUKEE
Spring water
Great Tornado 1883
GRAND RAPIDS
Lake St. Clair
The Venice of America
WAUKESHA
HOLLAND
Celery
LANSING
RACINE
Eggs
JANESVILLE
BATTLE CREEK
DETROIT
KENOSHA
KALAMA ZOO
ANN ARBOR
WISCONSIN
ILLINOIS
BELOIT
Chief Pokagon
Strength regained
JACKSON
Henry
BENTON HARBOR
Apples
Coal
ADRIAN
Lake Erie
MICHIGAN
INDIAN
OHIO
Perry 1813
Cats
Sox
GRAND
WABASH
SOUTH BEND
TOLEDO
CHICAGO
GARY
Striped skunk
Kankakee "Desert"
JEX

Where White Pine Once Was King

V. P. HOLLIS

A SLENDER ECHO OF THE PAST

A small stand of virgin white pine, near Drummond, Wisconsin, one of the few remaining. It will be cut this year. Michigan has protected several primeval tracts in state parks

Two centuries ago, the territory adjacent to the Great Lakes—the home of the Chippewa, the Menominee, and the Huron Indians—was a vast forest. It was bounded on the east by Lake Huron and by virgin prairie on the west and southwest. Lake Superior fringed it on the north, and in the southeast it merged imperceptibly into the great hardwood forest of the Ohio Valley and the Appalachian Mountains. This region, long spoken of as the Northwest, is the Lake States region of today, embracing the States of Michigan, Wisconsin, and Minnesota.

The forest, orginally covering some eighty-five to ninety million acres, or nearly three-fourths of the entire land area, was broken by thousands of large and small lakes, vast open muskegs or swamps, and in its southern extension—what is now southern Michigan and Wisconsin—by openings or "prairies" of a few hundred acres in extent. It was not all a forest of great, giant trees. Forest fires from natural causes, such as lightning, took their heavy toll even then. In exceptionally dry years blazes started by lightning or Indians would burn over hundreds of thousands of acres, particularly in the Lake Superior region, paving the way for great stands of jack pine. The age of these stands seems to indicate that the last large fire in that region occurred before the permanent advent of the white man, about seventy years ago.

The northern and by far the largest portion of this territory was covered with a forest of pine, spruce, balsam fir, hemlock, white cedar, and tamarack (larch). Amidst this cone-bearing forest, there were also broad belts of hardwoods, of sugar maple, yellow birch, beech, and basswood, interspersed mainly with hemlock and white pine.

The tree that gave character and distinction to the whole northern forest was the white pine. When fully grown, it commonly reached a height of from one hundred and fifty to one hundred and seventy-five feet and a diameter of from four to five feet. The largest trees, known as "cork pine", grew among the hardwood forest of maple and birch. When the white pine grew among the hardwoods, it towered high above them. When it grew by itself on the better sandy soils, it formed heavy stands comparable only to the redwood and the Douglas fir forests of the Pacific Coast. Over extensive areas, the white pine stands contained from twenty thousand to sixty thousand board feet to the acre, and single acres are said to have produced as much as one hundred and fifty thousand board feet. Solitary pine trees often scaled from five thousand

MICH. DEP'T OF CONSERVATION

ONE OF THE FEW LEGITIMATE BILLBOARDS

Placed in non-scenic spot, it plays its part in the constructive forestry program of the Lake States

Lake States' Forests—
Lost, Will They Be Regained?

by Raphael Zon

Director Lake States Forest Experiment Station

U. S. Forest Service

to seven thousand board feet. No wonder that this tree was destined to dominate the lumber production of the nation for nearly four decades.

The other two pines, characteristic of the region, were the Norway and the jack pine. The Norway pine grew on the light, sandy soils. The jack pine was confined to the poorest sand, and, helped by fires, is now occupying much more ground than originally. The lowlands or swamps supported dense forests of black spruce, balsam, white cedar, and tamarack.

South of a line that may be roughly drawn from Port Huron to Grand Haven in Michigan, across Lake Michigan to Milwaukee and from there in a northwesterly direction to St. Paul, Mille Lacs, and north almost to Red Lake in Minnesota, fringing like a belt the entire territory on the south, was a forest of oaks, white and red, walnut, hickories, and ashes. The remnants of this hardwood forest are still preserved as woodlots, dotting the farms of southern Michigan, Wisconsin, and Minnesota.

MINNESOTA ARROWHEAD ASS'N

NORWAY PINE IN MINNESOTA NATIONAL FOREST

Washington Park, Milwaukee, illustrates the way trees help to frame the beauty of Lake States' waters

MILWAUKEE ASS'N OF COMMERCE

Such was the original forest, evolved through uncounted years under the topography, climate, and soil conditions of the region. It was a forest in which the balance of Nature was not disturbed. The primitive habits and primitive tools of the Indians and early French traders were not strong enough to change the character of the forest. Nature quickly healed the wounds made by the fires. The destiny of this forest was still hidden in the womb of time.

The forest entered its present historic arena with the advent of the early American settlers after the Revolutionary War. These early settlers came not in search for timber. They came to settle on the land, to hew farms out of the woods. The forest appeared to them as a foe—as a wall which stood in the way of

their clearing the land. To convert the rich soil under the forest into farms, they had to carry on an unremitting struggle against the forest, fight timber wolves, wildcats, hungry bears, and hostile Indians. The timber itself had no immediate value, and there was so much of it.

The exploitation of the timber itself did not begin until about 1850. The impetus to the growth of the lumber industry in the Lake States region was given by the rapid settlement of the north central and prairie States, soon after the Civil War. From the north of Europe and from many worn-out New England farms stream after stream of immigrants trekked into the northwestern territory, first in "covered wagons" and later by railroads which stretched across the plains. Cities sprang up like magic.

The settlers needed houses, barns, wagons, and fencing. The people in the cities needed homes, warehouses, sidewalks, chairs and tables, fire-wood, shingles, fuel, and lumber for the manifold purposes of an early civilization built entirely on wood. The white pine forests of the Lake States were the one place from which a seemingly inexhaustible supply of lumber, admirably adapted for building purposes, could be drawn. The period of the great migration of people into the prairie states coincides with the period of the great cutting of the northern pine forests.

Civilized man made a concerted attack upon the forest with an army of fighters. Farmers from the southern parts of the States and from Ohio and Indiana journeyed by the thousands into the pineries to work as loggers. The great mill towns, Saginaw, Au Sable, Escanaba, Marinette, Green Bay, Eau Claire, Minneapolis, and others rose, each crowded with sawmills. For three decades, between 1870 and 1900, the Lake States were the greatest timber producing region in the country, and the chief output was white pine lumber. By 1900, Michigan and Wisconsin had practically cut out their white pine. Whatever white pine lumber the region has produced since that time came, and still comes, from Minnesota. As the cut of white pine declined, the hardwood lumber industry came into its own. It, too, however, is now practically at an end in lower Michigan. Sufficient supplies of hardwood still remain in the Upper Peninsula and in northeastern Wisconsin to maintain the hardwood industry on a large scale for about two decades. But the region which once occupied the first place in the national output of lumber has now dropped to the fifth rank. Today the timber cut does not meet the needs of the region and lumber is being imported from the outside.

UPPER PENINSULA DEVELOPMENT BUREAU

THE AFTERMATH OF THE FLAMES

Poplar is among the first to spring up after cutting or fire. It has proved its usefulness

Less than eighty years saw the lumber industry sweep away all but a few remnants of the original eighty-five million acres of forest. Only eighty acres of virgin white pine and a few thousand acres of the original hardwoods are left in the Lower Peninsula, about five million acres of old hardwoods in the Upper Peninsula and northeastern Wisconsin, and not over one million acres, mostly of Norway pine, in Minnesota.

A sad heritage of millions upon millions of acres of ruined and desolated land was left in the wake of the heyday of lumbering. The sandy pine lands were hit especially hard. The heavier fertile soils which supported hardwoods, particularly in the southern counties, are now in farms. There are found thriving towns and fast-growing industrial centers. But the sandy pine lands and the more rugged and rocky soils of the most northern country proved unsuited to grow corn, wheat or potatoes, or other farm crops in paying quantities. Settlers who tried to cultivate them were starved out. There are in all some twenty million acres of such cut-over land, about ten million in Michigan, six million in Minnesota, and four million in Wisconsin. Approximately one-sixth of the entire land area of the region is in this condition.

Millions of acres of these "cut-overs" are fire-swept and blackened. Millions of acres are covered only with stumps, brake, berry bushes, and patches of inferior forest growth. They are abandoned by their owners, produce no taxable wealth, and retard the development of the local communities. They weigh heavily upon the remaining settlers in the region, the small business man in the town, and every productive enterprise. They threaten with bankruptcy many local communities and are by far the biggest economic problem that the region faces today.

The present generation, when confronted with the melancholy sight of these millions of acres of desolated land, naturally point their finger to past logging as the principal cause for the present situation. In their resentment, they lose historic perspective and forget the contribution which the lumber industry has made to the upbuilding of the region. Who can weigh on the scales of history and tell whether the price paid was too high for raising the region from obscure commonwealths of lowly rank to high position among the leading states of the Union? Who can deny that the region owes much to its virgin forests, and that the country as a whole, too, is indebted to the woods of the Lake States which sent their timber and their lumber far and wide to help in the building of a growing nation?

It was the lumber industry that in the 70's and 80's drew population to the Lake States because there was plenty of work in the logging camps and at the mills. It caused railroads to be built up and down and across the states. It aided agricultural development by giving farmers markets for their crops. It gave impetus to the general

WHERE GODS OF CARELESSNESS ONCE RULED

Cut-over or burned areas like this comprise one-sixth the area of the Lake States

THE HOPE OF A NEW DAY

Replanted acres in the Huron National Forest, which spell future prosperity

LAKE STATES FOREST EXPERIMENT STATION

commercial development of the region, for the logging camps and lumber towns needed supplies of many kinds. It had a leading part in furthering the educational and civic advancement of the states, because for a long time it was the principal source of taxation revenue, and is still a source of support for many of the educational institutions of the region.

It left a serious problem, however,—the problem of economic rehabilitation of the millions of acres of cut-over and burned land. New economic forces are at work which point the way toward its solution. First of all, the old idea that the sandy soils of the pineries and the rocky, rough land of the north can be settled by farmers is now dead. Even the most enthusiastic agricultural promoter admits that the only use to which such land can be put is that of growing timber. The present economic trend in agriculture with its shrinking area, concentration on better soils, improved methods of cultivation, and better paying crops, brought a more sober, realistic attitude toward the solution of the cut-over land problem.

Another factor is the increasing use of trees, such as jack pine and popple (aspen), for pulpwood, box material, and similar uses. Barely a dozen years ago these "poverty woods" had no commercial value. Today, they bring a fair stumpage price, and jack pine is eagerly sought by many pulp and paper plants competing for raw material. They are the trees that first appear after fires, and for this reason occupy much of the land which originally supported white and Norway pine. They reach merchantable sizes in from thirty-five to forty years, and on the better soils may yield as much as from thirty to thirty-five cords of wood. Forest fire protection, which is becoming more effective in the region every year, is bound to benefit these species first of all.

The advent of the automobile, strange as it may seem, is also playing an important rôle in the reclamation of this abandoned land. The automobile brought a new appreciation of the country and created an insistent demand for good roads. These roads have opened to the recreation seekers of the country the region's rich treasury of scenic attractions—its thousands of miles of exterior coast line, its tens of thousands of inland lakes, its streams, its valleys, its hills, its near-mountains, its woods, and its wilderness. As a result, the recreational industry of the region—an industry that already rivals the once proud lumber industry in profitable returns—is making tremendous strides and has seemingly no limit to its opportunities for expansion, and its backbone of the recreational industry is the forest. Lakes and streams set in a background of blackened, desolate, depressing cut-over shores hold no allure for the tourist, the resorter, the Nature lover. But a lake in a setting of a green forest is a delight to the eye. A stream shaded with trees is a nourishing covert for trout and a restful place for the angler.

This new appreciation of the forest has led to a better understanding of the need for fire protection, for forest planting, for the establishment of county, state, and national forests. Great areas of wilderness are being set aside as outing, fishing, or hunting clubs. In the three states, the area now in state, municipal, and county parks, resorts, clubs, shooting grounds, hunting and fishing preserves, and in state and private game refuges is close

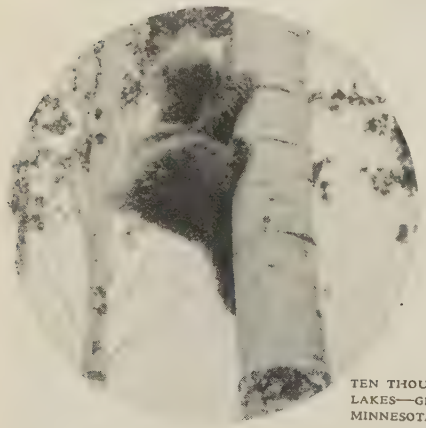
(Continued on page 341)

(Left) Au Train Falls, near Munising, Michigan, is one of the most delightful waterscapes in this land of streams, lakes and rivers

UPPER PENINSULA DEVELOPMENT BUREAU

(Below) The state of Wisconsin has set aside for posterity this twining strip of Green Bay shore line by creating Peninsula State Park

F. RODNEY PAINE

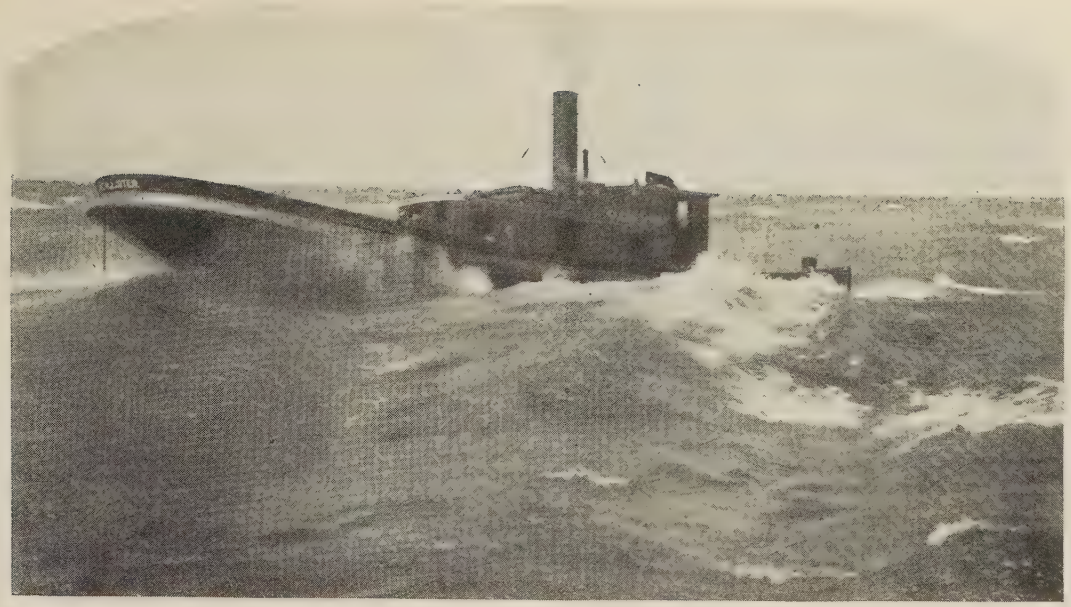


(Left) He's up a tree for fair, this prickly denizen of Lake States forests, and woe to him who tries to dislodge him. But after all, porky's looks are worse than his disposition

TEN THOUSAND LAKES—GREATER MINNESOTA ASS'N

(Left) Just one of the ten thousand lakes of which Minnesota boasts is West Bearskin Lake, in the Superior National Forest, but it exemplifies the beauty of the land of sky-blue water

F. RODNEY PAINE



DIRTY WEATHER DOES NOT STOP THIS FISHING BOAT
Through storm, fog and cold, the fishing fleet continues to reap its finny harvest to supply a continent

Fins *of the* Inland Seas

Valuable and Varied is the Lake States' Fish Life

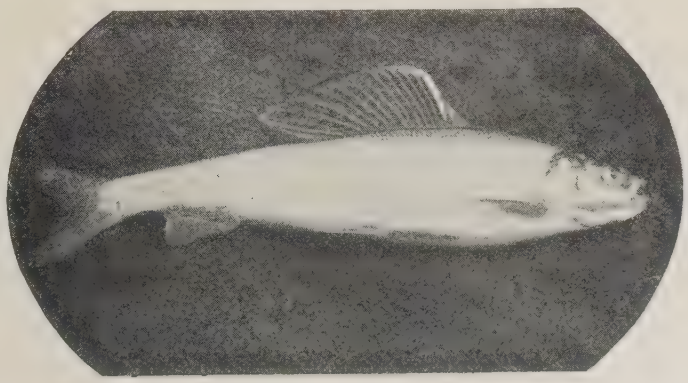
by Walter Koelz
University of Michigan

Out through the mist-tortured dawn, in all but the coldest winter season, travels the Lake States fisherman to his favorite grounds, in search of the silvery harvest. Perhaps he goes in a power boat, with miles of nets on the deck, a mere cog in a great scheme to turn the denizens of the depths into money for himself and food for thousands. Or perhaps, a pleasure seeker, he travels in canoe or on foot, equipped solely with a five-ounce rod and the urge to pit the skill of wrist and eye against the strength and courage of the trout. Yet he will probably little realize that his quarry, the thing of a moment to him, exists only because of endless ages of geologic change, that the fish life of the streams and lakes owes its being to the effects of ice and erosion and continental uplifting during time reckoned a thousand thousand years.

For ages the land lay beneath the ocean and layers of great thickness were then deposited upon it. Finally it rose, to start in motion the agencies of erosion, which began to level the crests and sculpture broad river valleys. There were then no important lakes, it is believed—the network of water bodies of today is the consequence of developments of the Ice Age, when colossal glaciers descended from the northeast over the entire Great Lakes region, scouring and blocking depressions to form great lake basins. All life was driven before the ice advance, so that there was a time when probably the only fish of this region were those few species that now prefer the colder waters of the north.

Then followed many complicated changes. Rivers opened Duluth, Chicago, Fort Wayne and Syracuse, at one time or another, to the south. Lake Ontario became, for a while, a marine gulf. As the ice withdrew, through the south-flowing streams returned the exiled fish, and when the water became fresh again in Lake Ontario, even relics of the ocean fauna remained.

To these tremendous geological changes the region owes its mingled and abundant fish life. Some one hundred and fifty species are known to come from the Great Lakes, their tributaries and the head waters of the great rivers to the



THE GRAYLING
Once he choked Michigan streams; he is now little more than a memory

GAMEST OF ALL
He was recognized as a fighter extraordinary by fishermen

WORKING TO SAVE THE FISH LIFE
Taking spawn from big fish to restock the Great Lakes. This is one of many conservation attempts

South. Many other species have been introduced here by man.

The chief elements of the fauna that came from the north are the whitefishes, the lake herrings and the trouts; all of them stop far short, in their distribution, of the southernmost advance of the ice, and many are confined to the cold waters of the Great Lakes, even to their icy depths. Certain minnows, the basses, the sunfishes, the catfishes, have returned from the south to territory they once occupied, but the Lake States mark their northernmost advance. In the Lake Ontario region several fish ascended from the ocean or were left behind when the sea last departed, including the eel, the alewife, shad, smelt, salmon and the sea lamprey. Man has successfully introduced the rainbow trout from the west, the carp and brown trout from Europe, and the goldfish from Asia.

The northern fish in the main eat only animal food, live in schools and spawn in the fall, giving no care to their young. The southerners comprise both plant- and animal-eaters. Some live in schools and some singly, but none spawn in the fall and many build elaborate nests and give considerable attention to their offspring. The ancestors of the sea relicts of the Lake Ontario region ascended into fresh water to spawn, and returned to salt water for the rest of the time. Their landlocked descendants no longer return to the ocean, although the eel still migrates thousands of miles to the salt water spawning beds, in far southern waters.

Given so many kinds of animals a great diversity of habit is to be expected. Thus some fish prefer warm water; others can live only in ice water; some want running water; others are happy in stagnant. And so in the region some kind of fish may be looked for wherever there is any water at all. The mud minnow and the three-spined stickleback thrive in the puddle that dries up in the summer drought and the lawyer and the cock-atoosh find something to their taste even in the nine hundred foot depths of Lake Superior.

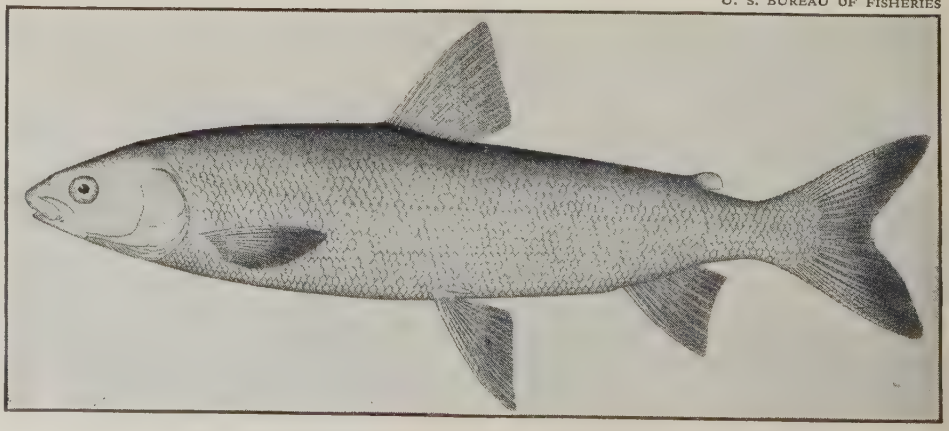
The kind of fish that live in the streams of the region depends on the water temperature. In the southern section the suckers and shiners, including dace, creek chubs, stonerollers and others of the minnow family, are the dominant fish. Fish of these groups are peculiar in having more or less powerful teeth in the throat instead of on the jaws. During the breeding season the males usually take on, in addition to the higher color typical of most breeding fish, horny growths on various parts of the body and fins; thus the sexes at that season do not closely resemble each other. The breeding behavior of many of the species is very elaborate and extensive nesting sites are often prepared. The river chub, for example, a fish not usually over seven or eight inches long, gathers together as a nest a heap of stones, often several pecks. The horned dace digs a hole in the ground, making an elongated mound with the excavated material. Some of the minnows undertake no nest construction, but many pick out a site and drive off trespassers. As with fish in general, the male only keeps watch at the nest, but the vigil is not of long duration and no care is given to the young. These fish for one reason or another are not important for food. The suckers grow large enough, but their flesh is soft and bony. Few of the minnows become of suitable size for eating but are of first importance for fish-bait.

In the north the minnows become fewer in species and in numbers but their place is taken by the brook or speckled trout. In late years rainbow and brown trout have been introduced into these streams. The brook trout feeds on the food that minnows elsewhere eat and on the minnows themselves. The newcomers have the same food habits and often eat the brook trout in addition. The grayling that once was found in the coldest and purest northern streams is now almost extinct.

As streams grow larger, quiet pools are formed in their course and in these another group of fish may be found, those that regularly inhabit the myriads of lakes of the region. Every fisherman of the lakes knows well the sunfish, bluegill, perch, black bass, calico bass, pike and bullhead. He may know too the darters, top-minnows, shiners and miller's thumbs that are also a part of the fish census of the average lake, but more likely he hasn't noticed them or has taken them for fish not

THE MOST FAMOUS FOOD FISH OF THE LAKE STATES
The celebrated whitefish, for which Indian tribes have been named, and which ranks as the tastiest of fresh water denizens

U. S. BUREAU OF FISHERIES



yet grown up. The pike and black bass challenge the skill of the lake angler, and the sunfish, bullhead and the rest attract his less experienced family.

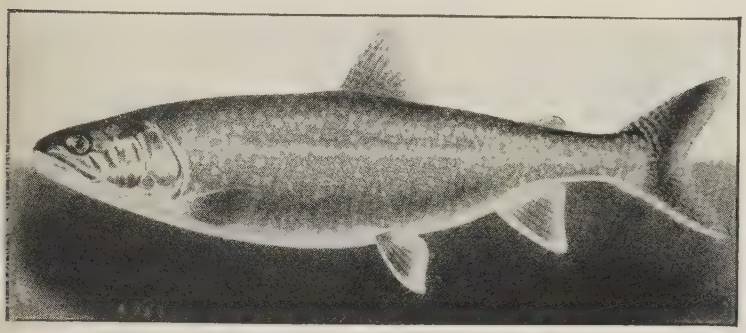
Nest building and care of the young reach great development in the fish of the lakes. In the case of the sunfish, the black basses, rock bass, crappies and bluegill, the male fish sweeps a hole in the bottom for a nest. This hole is usually two or three times greater in diameter than the length of the maker and contains gravel, shells or rootlets to which the eggs are usually found attached. The male fans these eggs with his tail and keeps guard against robbers, attacking large fish and even intruding turtles.

Some fish take considerable pains to get their offspring started in life after they are hatched. The bullhead and dogfish are notably considerate parents and such a father may be found chaperoning a squirming ball of several hundred to several thousand youngsters, each an inch or more long. Such prolonged nursing is

BUTLER

WHERE LIE THE WILY TROUT

Bond Falls, Michigan. Below is the lake trout, a delicacy, yet rapidly dwindling in numbers



U. S. BUREAU OF FISHERIES

surprising in view of the omnivorous habits of these fish; but the males while domestic have, as a rule, poor appetites. The females on the other hand are not so abstemious and undoubtedly would eat their own eggs.

In general the larger the lake the more kinds of fish it contains, so the Great Lakes have many species; in fact, almost all the fish of the region occur in them. The shallow bays are much like the inland lakes and have the same fish, but the deep expanses are populated by fish that prefer cold water. The lake trout, whitefish, herring, six species of herring-like fish called chubs, and the lawyer or loche are the important elements of this group. All but the chubs may be found in a few large and deep inland lakes, though the herring is the only one that is at all generally distributed in such bodies of water at this latitude. The chubs do not often come into water shallower than one hundred feet and some of them keep always in depths of five hundred to six hundred feet.

All of these, except the lawyer, are relatives of the salmon and are very valuable food fishes. The whitefish has been a favorite from the days of the red man. It has given its name to Indian tribes. Early explorers singled it out for mention because of its dainty flesh, and modern epicures have ranked it first among fresh water fish. The lawyer is a cousin of the ocean cod, but has not the popularity of its famous relative. Other fish do not eat it, nor will the herring gull, unless times are bad, and gulls do not otherwise appear to be finicky. It has lately, however, found a place on the market.

For many decades the Great Lakes have supported immensely valuable fisheries. It is estimated that several hundred million pounds have been produced annually for the last fifty years, and more than twelve thousand people now are directly engaged in fishing for the market.

Large steamboats and expensive gear are used in the fishing industry. There are many boats on the lakes that are seventy-five feet long, and require six men to operate. These boats carry their nets sometimes fifty miles from port. The nets thus set are always gill nets, so-called because they stand on the bottom like a tennis net and catch the fish by the gills when they try to pass through the fine meshes. A string of nets five miles long is not an unusual gang, and each boat may have several such gangs in the water at one time.

There are numerous smaller boats that fish along the shores with pound or trap nets. These nets are fixed in water less than seventy-five feet deep, as a rule, and take the fish alive.

A popular method of catching certain species, especially lake trout, involves the use of set lines. A long line is let to the bottom to which are attached at regular intervals a short line bearing a baited hook. A small fish called a bloater is commonly used for bait, its usefulness due to the fact that it fills with gas when brought to the surface and hence when put onto the hook floats, thus keeping the hook above the bottom. Several thousand hooks are employed in a gang and the main line may run for five miles or more.

The fish are generally shipped on ice to the large cities of the lake states and to New York City, and all except the chubs, which are smoked, are sold fresh. In the fall many herring are salted and sold mainly in the southern states.

Fish have been a great factor in the development of the region. As once the wealth of the land lay in its fur, so with the passing of the fur regime came another era with the exploitation of forests, mines, and the Great Lakes fisheries. Attracted by unspoiled fishing,

(*Continued on page 342*)

Minnesota chose to represent her the delicate moccasin flower, one of the orchid clan, and a dweller of deep glens. No fairer bloom exists in any part of the country

TEN THOUSAND LAKES-GREATER MINNESOTA ASS'N.

E. L. CRANDALL

E. L. CRANDALL

The violet, whose blue bedecks Wisconsin fields in the spring-time, has been given the place of honor among flowers of the Badger State

Youth among the apple blossoms. They symbolize the deep-fruited orchards for which Michigan is rightly famous

J. C. ALLEN

Michigan and Wisconsin chose the wild rose, winner in the National Referendum, as National Flower, and Minnesota, though preferring the columbine, likewise gave it more votes than its "favorite son" received

UPPER PENINSULA DEVELOPMENT BUREAU

A ROCK GARDEN OF THE LAKE STATES

This northern borderland, with its rugged climate, has taken enthusiastically to this type of flower growing

GARDENING IN THE NORTHLAND

How the Settlers Preserved Their Heritage of Blooms

by Huron H. Smith

GARDENING in the Northland is no Topsy performance. Plants don't just grow—they must be born of infinite care. Just as the immigrants sweeping into the Lake States during the nineteenth century discovered that life was not to be a lyric poem, so did they discover that they must make careful choice of their plantings to maintain their traditions of beautiful gardens carried across the seas. The sturdy German farmers, the dike-building Hollanders and the rugged Scandinavians populating Wisconsin, Minnesota and Michigan soon found ways of adapting their favorites to the changed conditions of temperature and wind. The Scotch and the English likewise perpetuated, as they settled in this land, the floral victories their forefathers had won, and today, in this Land of Sky-Blue Water, it is almost a truism that a man's race can be told from the front "yard" he keeps.

Perhaps the most interesting gardens of the Northland are those of the aboriginal inhabitants, our first Americans, the Indians, now more numerous in Wisconsin and Minnesota than they were at the time of the census of 1812. The Ottawa, **Ojibway, Menominee,** Pottawatomi and Meskwaki represent the forest dwellers, while the Sioux and Winnebago represent the plains Indians. For many centuries before the white man ever saw the United States, these tribesmen worshipped the flowers of the forest, plain and bog. Their religion was largely based upon plants.

Indian flower gardens are usually reminders of what our flower gardens used to be a quarter of a century ago. Plenty of annuals, such as nasturtiums, pinks, morning-glories, balsams, touch-me-nots, cosmos, zinnias and verbenas are to be found. They are in many cases reminiscent of the good old days of congressional free seed packets and we find them still growing salpiglossis, calliopsis, gaillardia, and coreopsis, but usually totally ignorant of the names of these posies. Hollyhocks also are favorites. They generally grow but four vines,—Virginia creeper, *Clematis paniculata,* trumpet creeper and hops. The modern Indian is most pleased with variations from these old standbys and now has developed a taste for dahlia, gladiolus and phlox, among others.

MILWAUKEE PUBLIC MUSEUM

BROUGHT OVER BY THE FIRST FAMILIES

Though a prey to pests and disease, the beautiful snowball, favorite of the pioneers, finds a home on many a northland farm or city yard

The character of the early immigrants to Michigan, Wisconsin and Minnesota has had much to do with the beauty of the gardens of the region. Those religious and political exiles from Germany who joined the great immigration of 1848 found in these states a region not differing greatly from their homeland. The *hausfrau* did not forget her garden posies, and in many little hamlets throughout our territory one might easily imagine himself back in quaint old Nuremberg. The practiced eye can find many of these homes in such metropolitan centers as Detroit, Milwaukee and Minneapolis. Old-fashioned gardens, with mignonette and forget-me-not, pansies, larkspurs, hollyhocks, hen-and-chickens and a Christmas cactus or two speak more plainly than words that here is the home of a solid German-American.

The German women settlers of that period had a positive passion for gardens, and kept them attractive at all seasons. Snow-drops and crocuses started the spring; pansies began in a sheltered spot, then went to a circular bed in the front yard to be framed in ice plants. *Iris germanica* in forgotten varieties garlanded the perennial border, in company with bleeding heart, valerian and bachelor buttons. The Germans are still the source of many perennials for transplanting.

About June ten the house plants—begonias of the overblooming and Rex types, unbelieveably tall and robust geraniums, sturdy peperomias, variegated coleus, languorous heliotropes, bright forget-me-nots, and finally the big tubs of night-blooming cereus and the dormant oleanders, scarcely ever seen elsewhere,—were brought forth. The summer-flowering garden in the side yard or rear of the house was a curious collection of utility, curiosity and fragrance. Candytuft, hen-and-chickens, dusty millers and spineless verbenas formed the edge; farther within were white tansy, immortelles, yarrow for their "schafesgarbe-tee", love-lies-a-bleeding, love-in-a-mist, the old Maltese Cross, honesty, monkshod, annual larkspurs, annual phlox, calendulas, marigolds and four-o'clocks. The fence supported southern-wood, and hollyhocks. Morning-glories framed the back porch.

Mignonettes for cutting, silver sage, sweet marjoram, poppies for their savory seeds for baking, dill, fennel and caraway, formed the utility part of the garden. Hans and Gretchen bequeathed a pleasing old world touch of neatness and thrift to the northland.

Hollanders have not been far behind the Germans in settling the northland, though they have clung more to their individual communities than the Germans have. In dairy districts, we see them still extending their attention upon bulbous stocks. Early tulips, jonquils, narcissus and daffodils nod in the breeze from neatly attended formal beds. The Star-of-Bethlehem surely must carry some religious significance as well as floral beauty with them. In their front yards is about the only place where one will find azaleas blooming. This section has not the right soil for azaleas, so the Hollanders grow them in tubs. Lemon lilies, *Hemerocallis flava,* in circular beds, seem to be one of their necessary fixtures. While they do not have the great variety of flowers that the Germans grow, yet they are noted for their borders of pentstemons, scabiosas and china asters. These thrifty folk are often found cashing in on their early

WILDINGS ARE FAVORITES

Not everyone of the great numbers turning to the woods for plants is able, however, to grow small white lady's slipper

MILWAUKEE PUBLIC MUSEUM

training and skill by raising bulbs on a commercial scale, since the quarantine regulations curtailed the import of cheaply grown bulbs from Holland. Such districts in Michigan and Wisconsin are locally known as "Little Holland".

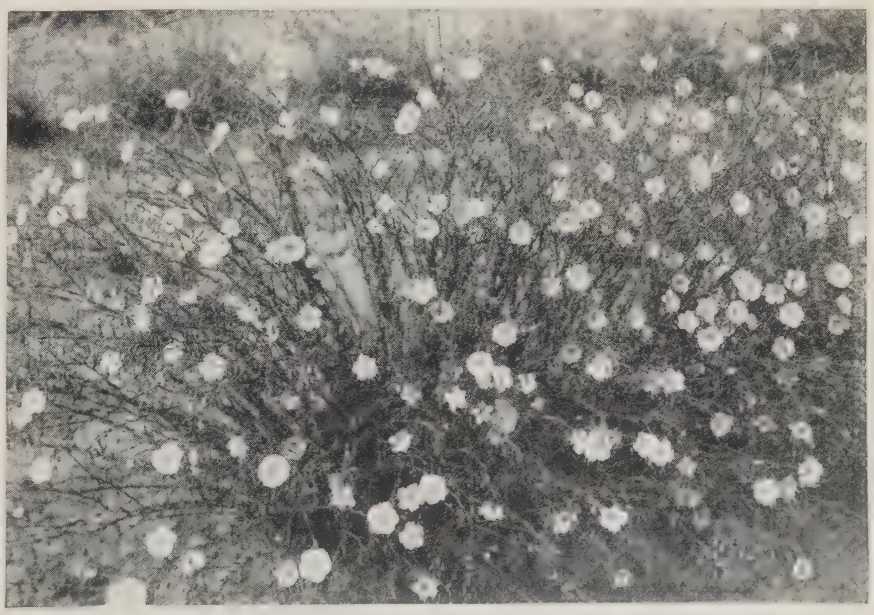
The winters of these states sound like home to the Norsemen, so the majority of the Swedish, Norwegian and Danish immigrants have found a way there. Their tidiness is proverbial and their love of flowers has raised many of them to the rank of successful nurserymen or owners of perennial or strawflower farms. Their love of alpine flowers has given the rock garden a firm grip upon the fancies of the inhabitants. The Scandinavian cultivates every inch of his property, especially if he is a little restricted in acres. If we pass his place in the spring, we will find snowdrops, squills and moss-pinks. Later the Jacob's Ladder, columbines and coral bells will be springing up. His fences will likely be covered with perennial peas and morning-glories. The old-fashioned Persian yellow single rose will be a decoration for his front gate entrance, and he will have possibly one or two other hardy roses. Distinctive of his flower gardens are foxgloves, cockscombs, everlastings, wormwood, and hardy chrysanthemums. The Scandinavian housewife is also fond of her winter window flower garden and will grow wandering jew, geraniums and begonia slips, flourishing in tomato cans. When summer comes, these find their way outdoors.

The English and Scotch have also found the northland pleasing and but to mention their nationality is to say the last word in flower gardening. They have surely clung to the lowly primrose and none seem to know how to raise this difficult flower as well as they do. Violas please the British settlers better than pansies, Sweet rockets, *Hesperis matronalis,* we owe to them. Moss roses, those hardiest garden roses, were first brought here by those from England. The Britisher or Scotchman will ever be found well supplied with roses, hardy perpetuals, perhaps some tree standards and even a few hybrid teas.

A few things he brought to the northland suit us little better than the English sparrows. We can recall five of them: bouncing bet, moneywort, gill-over-the-ground, butter-and-eggs and cypress spurge. None of these stay put. Some kept the native superstitions surrounding them, such as butter-and-eggs. Early English farmers planted them in their barn yards, so that the milk would be sure to produce butter; the power of suggestion, we suppose, was exerted on his cows. But to them we owe also the centenarian peonies, the English wallflowers, stocks, the English daisy, harebells, canterbury bells, bluebells, sweet sultan, many kinds of pinks, blue lobelias and hollyhocks.

The English also liked their fragrant gardens and pot herbs and we usually find in their back yards such plants as lavender, mint, basil, thyme, parsley, summer savory, tansy, and tarragon. Two of their shrubs have

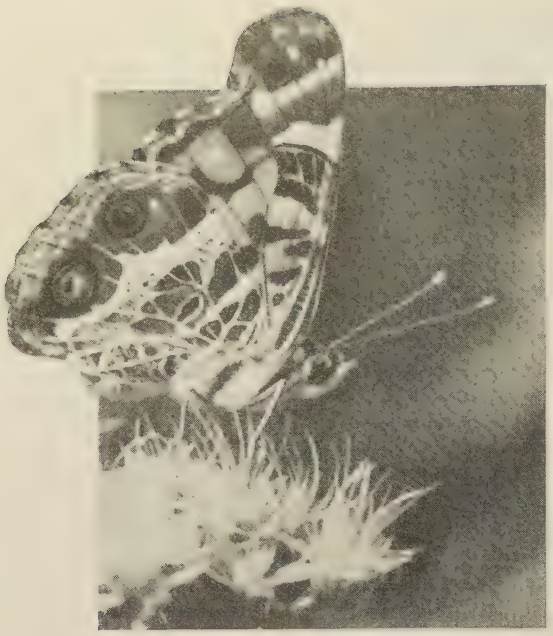
(*Continued on page 338*)



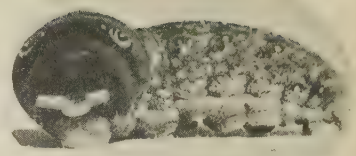
FLAX OF THE ENGLISH

t has maintained its popularity ever ince the first English settlers established it in its Lake States home

MILWAUKEE PUBLIC MUSEUM



THE PAINTED BEAUTY
The Lake States harbor this handsome butterfly
GEORGE T. HILLMAN



LIKE A GINGERBREAD BUG
Most grotesque and terrifying is Papilio's caterpillar
J. A. BROSNAN

INSECT LIFE

The Lake Land Shelters Many Kinds

by Edward G. Reinhard
University of Minnesota

A LAND of more than 20,000 lakes, bordered by the largest of America's great inland seas, with drainage systems flowing northward to Hudson's Bay, eastward to the Atlantic Ocean, and southward to the Gulf of Mexico, cannot fail to give rise to a remarkable water fauna. Just as to the student of etymology Minnesota means "The land of sky-tinted water", and Michigan "The land of great water", and Wisconsin "The meeting place of the waters", so to the student of entomology these states signify a region teeming with aquatic insects.

Great was the delight of John Muir during his boyhood on a Wisconsin farm to watch the little black Gyrinid beetles whose "whole lives seemed to be play, skimming, swimming, swirling, and waltzing together in little groups on the edge of the lake and in the meadow springs, dancing to music we could never hear." The pond-skaters, too, seemed to him to be "wonderful fellows, shuffling about on top of the water, with air bubbles like little bladders tangled under their hairy feet," and the water-boatmen "were not less wonderful."

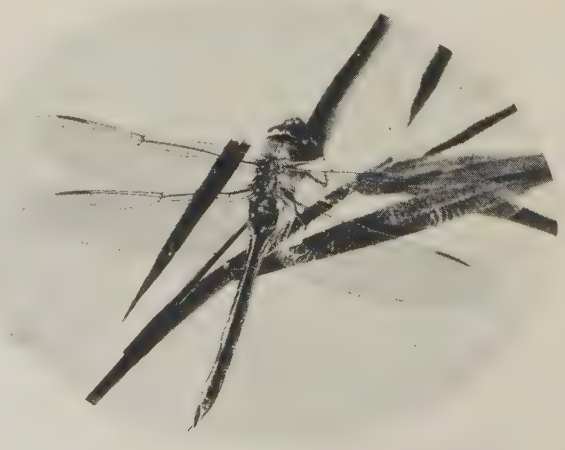
But one need not be a naturalist to be astounded by the richness of water-bred insects in this paradise of lakes and streams. The vast multitudes of May-flies that swarm through the air have been known at times to disrupt all business life in some of our riparian towns. These frail creatures, issuing from the water at the season of their swarming flights, have swept through the streets like a snow storm, impeding traffic and discouraging pedestrians by their heedless flight. Below the street lamps their dead bodies have fallen in heaps and have been shoveled away by the bushel.

On the shores of Lake Pepin midge swarms have become a yearly occurrence. For ten days at a stretch, twice a year, these little fellows appear in such numbers that the visitation becomes a scourge. Words cannot describe the dense crowds that fill the air and cover buildings, trees and grass. Identified as *Chironomus plumosus,* they resemble large mosquitoes, but fortunately they neither bite nor sting. Their larvae are the "bloodworms" which dwell in the mud at the bottom of lakes and streams, and in Lake Pepin as many as six thousand larvae have been counted in one square yard of bottom.

The astonishing abundance of such insects can hardly be looked upon as a nuisance since they are all choice food for our fishes. Ardent fishermen from the White House as well as from crowded tenements are drawn to this vacation ground to hook the finny fighters these aquatic insects have helped to rear.

Up in the northern woods there are other swarms of water-born insects, which, to be sure, are pests a-plenty. They are the black flies, persevering flails to man and beast. They breed in swift, rocky streams. The most hardy woodsman is vanquished by these tormenting gnats and even such a dauntless naturalist as Louis Agassiz refers feelingly to their attacks in his narrative of travels in the Lake Superior country.

The terrestrial features of these states likewise offer the most diverse conditions for the entertainment of insects of every rank and file. States which combine northern conifer-



UNIVERSITY OF MINNESOTA

THE AERONAUT AT ANCHOR
The buzz of the dragon fly is familiar in the land of sky-blue waters

A SPHINX CATERPILLAR
For all the world like a begging wire-haired terrier
J. A. BROSNAN

KING OF HIS KIND
The monarch butterfly adds brilliance to the landscape
CORNELIA CLARKE

ous forests with extensive hardwood belts, tamarack bogs, patches of prairie, and even typical sand dunes, are sure to be the haunts of a varied insect population. Each type of habitat is home for a winged host.

One of the most spectacular of butterflies, the Turnus swallow-tail, is often seen in the northern woods. About the shores of Lake Vermillion it occurs in countless numbers, a majestic black and yellow species. Even its caterpillars are startling and bizarre. When irritated they protrude a forked scent organ above the head and simulate the cobra by inflating a sort of false face which glares with two frightful eye spots.

The handsome comma butterfly with its thorny caterpillars is another common species. So too is the mourning cloak, the banded purple, and the viceroy, together with its pattern, the milkweed butterfly. One of the most beautiful sights in Nature is a migrating band of milkweed butterflies. In the fall these monarchs gather in large armies just previous to their southward journey, and such gatherings are sometimes witnessed about our wind breaks and along the sheltered river bottoms.

The dragon-flies and damsel-flies contribute to the vivacity of every country scene. They always attract attention because of their graceful form and sprightly aeronautics. The spotted Calopteryx and the orange colored *Ischnura verticalis* are conspicuous among the damsel-flies, while the huge dragon, *Anax junius,* is constantly at work from April to November hawking about lawns, cornfields and along the margins of the woods.

The "high-elbowed grigs", with clacking castanets and zithering music, turn the grassland into a hippodrome of agile jumping and noisy stridulation. The Carolina locust is possibly the one most generally noticed even though its coloration fits perfectly into the background of its habitation. The clear-winged locust, *Camnula pellucida,* is particularly abundant over uncultivated areas and dry soil, and almost thirty species of clumsy Melanopli find the Lake States suitable for their breeding grounds.

The much dreaded Rocky Mountain locust formerly invaded this part of the country. Its visitations were a veritable plague, leaving the farmers dazed and destitute. The advance of cultivation and scientific methods of control have now rendered this species extinct in this trio of adjoining states. Minnesota, Wisconsin, and Michigan are particularly fortunate with respect to plant pests. One can hardly point to a single injurious insect which creates havoc within these borders to an extent at all comparable with the depredations of the weevils, the fruit-flies, the corn-borers or the host of other insects which are such a serious menace to agriculture in other parts of the United States. Diversified farming, crop rotation, and a rigorous winter climate are some of the factors which contribute to the decrease of severe insect outbreaks.

In the shady forests the two-winged flies reach their greatest abundance and woodland beetles, encased in horny shards, burrow industriously deep into the tree

(*Continued on page 339*)

UNIVERSITY OF MINNESOTA
JUST A BOISTEROUS PAIR
Few worries have these lusty grasshoppers of the plains and dry lands

(Below) A gnarled red cedar stands guard on Gibraltar rock over the Lake Country of Wisconsin

MILWAUKEE PUBLIC MUSEUM

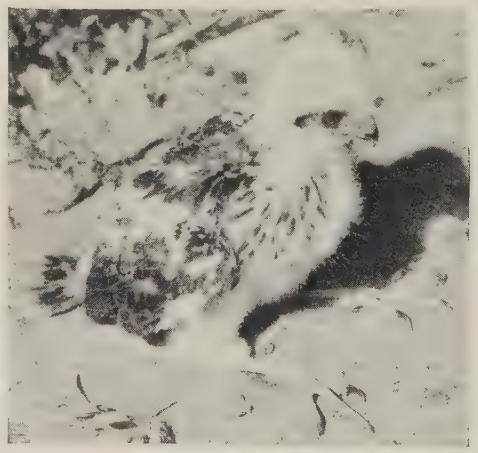
C. C. ALSTON

Br'er Raccoon, caught with stolen corn, and, below, the handsome skunk-cabbage, first to bloom in spring

TEN THOUSAND LAKES ASS'N

(Right) A young broadwinged hawk relaxes to think things over near his Lake States home

WIS. CON. COMM. AND A. O. GROSS

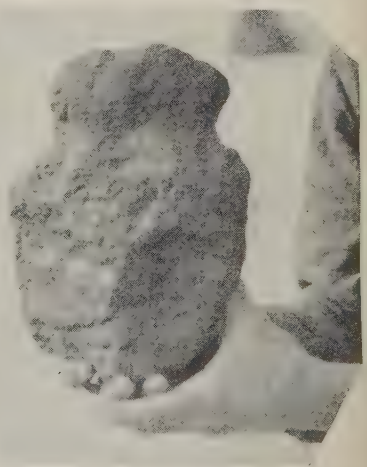


(Below) The rugged Rock Harbor on Isle Royale, Michigan, where dwells the mighty moose herd

MICH. DEPT. OF CONSERVATION

(Below) There were giants in those days, as this mighty prehistoric stone hammer, found in Minnesota, testifies

B. L. BROWN



WISCONSIN CONSERVATION COMM.

THE FAMOUS DALLES OF THE ST. CROIX
Preserved by Wisconsin and Minnesota jointly in Interstate Park as the site of many natural wonders

ACRES of SUN-LIT WEALTH

Anent the Past and Future of the Lake State Parks

by F. Rodney Paine

Superintendent of Parks, Duluth, Minnesota

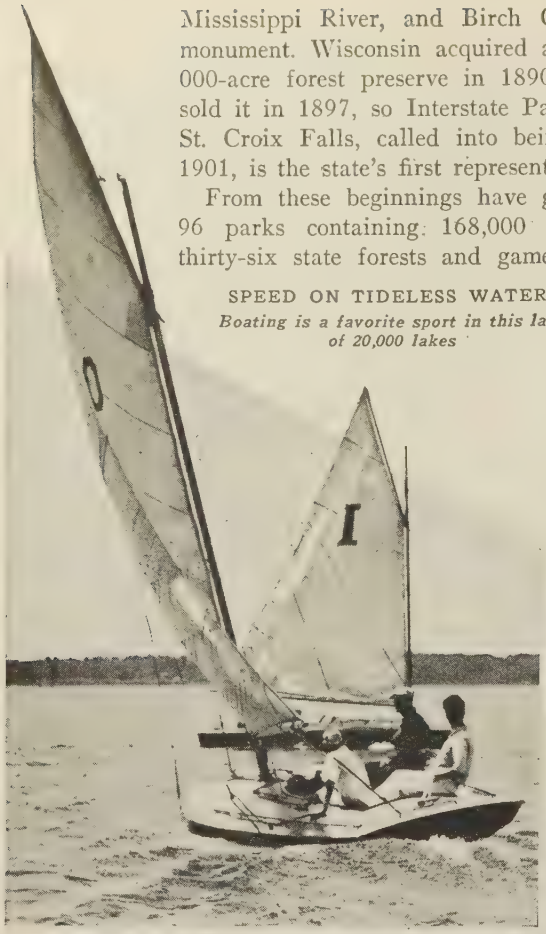
STATE by State across the country there has been a tide of public wastefulness ebbing finally against the high ground of public sentiment for preservation. The history of the old world as well as of our own country tells us that such sentiment only develops when the waves begin wetting the feet of personal privilege. Had the people who today deplore the cutting of our forests, the depletion of our wild life and the desecration of our beauty spots lived in the abundance of these things in pioneer days they would have wasted their patrimony as their grandfathers have done. Whether the tide turns sooner or later in one state or another has depended on the vision of government or individuals.

Not until the last twenty-five years have the Lake States come to realize the possible exhaustion of their "inexhaustible resources". This awakening expressed itself first in the desire to preserve the glories of the past—the forts and battle grounds of French and Indian days, the wilderness areas familiar to the early voyageurs and pioneer settlers. As the automobile made the range of the recreation seeker and sportsman wider and wider, what was first sentiment became a demand, and the result was State Parks, Forests and Game reserves.

DENIZEN OF THE PARKS
A young deer who has just outgrown his spots

MICHIGAN DEPT. OF CONSERVATION

Michigan was among the first states to create such reserves, and Mackinac Island and Fort Michillimackinac parks, established in 1885, enjoy eminence in park history. Minnesota, six years later, followed with Itasca Lake State Park, embracing the source of the



MINNEAPOLIS CIVIC AND COMMERCE ASSOCIATION

SPEED ON TIDELESS WATERS

Boating is a favorite sport in this land of 20,000 lakes

Mississippi River, and Birch Coulie monument. Wisconsin acquired a 50,000-acre forest preserve in 1890, but sold it in 1897, so Interstate Park at St. Croix Falls, called into being in 1901, is the state's first representative.

From these beginnings have grown 96 parks containing 168,000 acres, thirty-six state forests and game refuges aggregating 1,800,000 acres and nearly 4,000,000 acres of National Forests. The total area thus set aside is larger than Delaware, Connecticut and Rhode Island combined. The attendance in fifty-six of Michigan's parks rose, in 1929, to seven and a half million people, or more than one and one-half times the population of the State. More than 138,000 of this number were campers, of which one-fifth came from other commonwealths. Similar use of the parks has been made in Minnesota and Wisconsin, although in none of the three states is the park system program near completion.

There are four main types of state parks in the lake country: wilderness tracts, where primeval conditions abound; virgin timber areas preserving the last remnants of great forests; country traversed by beautiful rivers, ideally suited for recreational development for use by large numbers of people, and spots reserved principally because of their historical interest.

The State and National forests and larger state parks are the principal spots where deer, moose and bear, and abundant fish life still exist. The Superior National Forest in Minnesota is still much the same as the early voyageurs found it. Travel by canoe is today as easy as when Mackenzie threaded this country in the latter part of the eighteenth century—up the Great Lakes to Grand Portage, then up the Pigeon River and Boundary lakes to the Rainy Lake country—and his log of the trip will serve even now as an accurate guide.

WALTER HASTINGS

THE GREAT BLUE HERON

He oversees the order of things in several state parks

Wisconsin's "Northern State" Park, home of forty lakes, the Hanson Military Reserve, in the heart of Michigan's wildest forest land, and the fifty square miles of Itasca Park, which contain most of the varieties of animal and plant life native to Minnesota, are probably the most beautiful wilderness areas in the three states. Itasca also contains a remnant of the original stands of white and Norway pine that once covered nearly seven-eighths of the total area of the Lake States. Michigan's primeval timber is preserved mainly in Cheboygan, F. W. Fletcher, Hartwick Pines and Interlochen Parks, and in Northern Forest Park. All three states are protecting by state forests a large supply of second growth timber, destined some day to redeem the waste of fifty years.

Some of the most beautiful preserves in the region have been created along rivers, such as Interstate Park, in which Wisconsin and Minnesota jointly have set aside for recreational purposes the marvellous Dalles of the St. Croix. Here the pilot of the sight-seeing launch will point out "The Old Man of the Dalles", the "Lion's Head", the "Devil's Chair", and other curious formations. Huge pot holes, some eighty feet deep, carve the Minnesota shore. Wisconsin's Nelson-Dewey Park on the bluffs of the Mississippi River is

MICHIGAN DEPARTMENT OF CONSERVATION

CAMPING AMID THE DUNES

This Grand Haven, Michigan, park is one of several built on shifting sands

WALTER HASTINGS

A WINTER MIGRANT

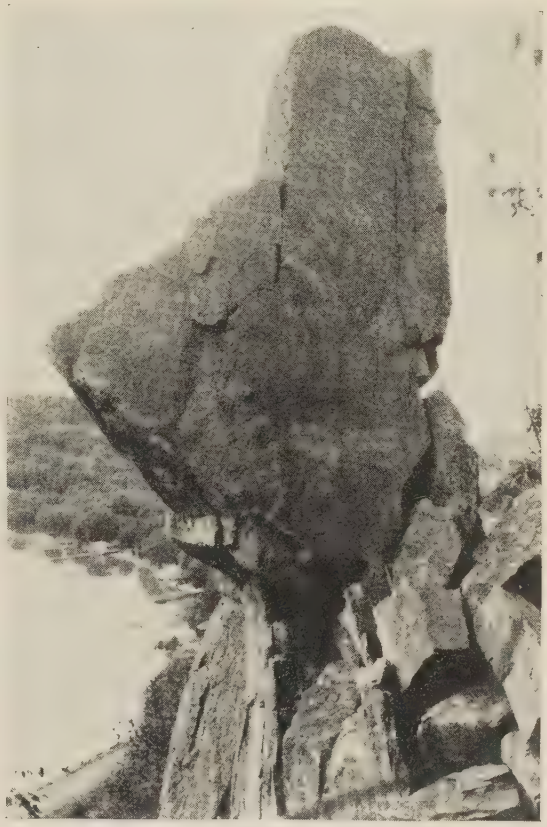
The beautiful snowy owl visits the parks

notable for its canyons with walls of ragged rock, its brilliantly colored sandstone, and its column of petrified moss, and Pattison Park in the same state includes the one hundred and sixty-five foot Manitou Falls of the Black River, caused by the change from hard Keeweenawan volcanic rock to soft red sandstone of the Superior plain. Michigan has four undeveloped small parks along the Père Marquette River, where fishing is unexcelled, and a Dodge Brothers preserve at Munuskong Bay. In Minnesota, the four thousand acres of Jay Cooke State Park extend five miles on either side of the beautiful Dalles of the St. Louis.

Michigan has led her sister commonwealths in protecting the shores of the Great Lakes, and her twenty-five parks cover more than thirty miles of shore line. Peninsula Park embraces three thousand, four hundred Wisconsin acres along Green Bay, but Minnesota so far has utterly neglected the bold coast of Lake Superior.

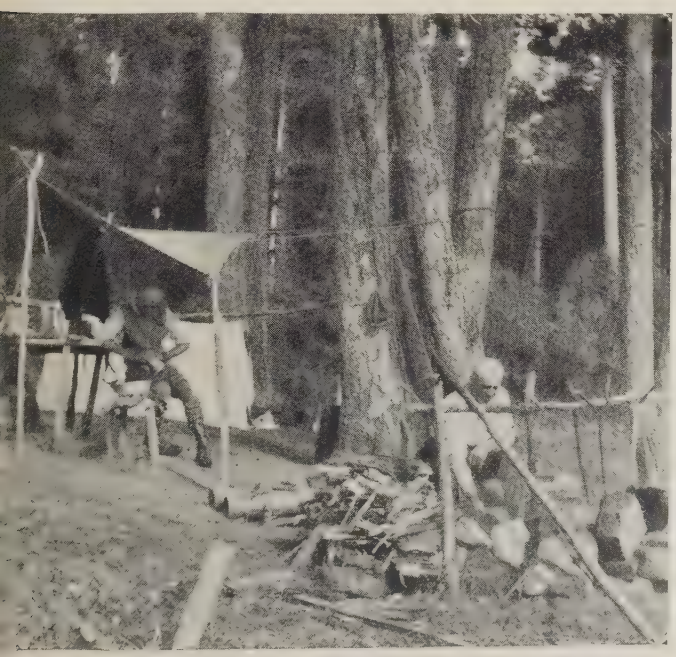
Many of the parks and monuments are rich reminders of early pioneer days. In Perrot Park is Trempealeau Mountain which Father Hennepin discovered in 1680, and where a few years later Perrot took possession of all the land drained by the Upper Mississippi in the name of Louis XIV of France. Mackinac Island commemorates the old day of British rule, and the four Minnesota state monuments, which vary in size from one acre to eight, mark many incidents of frontier life and Indian warfare. Birch Coulie is the site of a Sioux battlefield, and Traverse des Sioux Park marks the signing of the Indian treaty of 1851, while Wood Lake Park embraces the battlefield where was fought the last decisive contest of the Sioux war.

Unique, too, are those sand dune parks of Michigan—popular D. H. Day Park in Leelanan County, P. F.



CRAGS AT DEVILS LAKE PARK

Wisconsin preserves this interesting formation



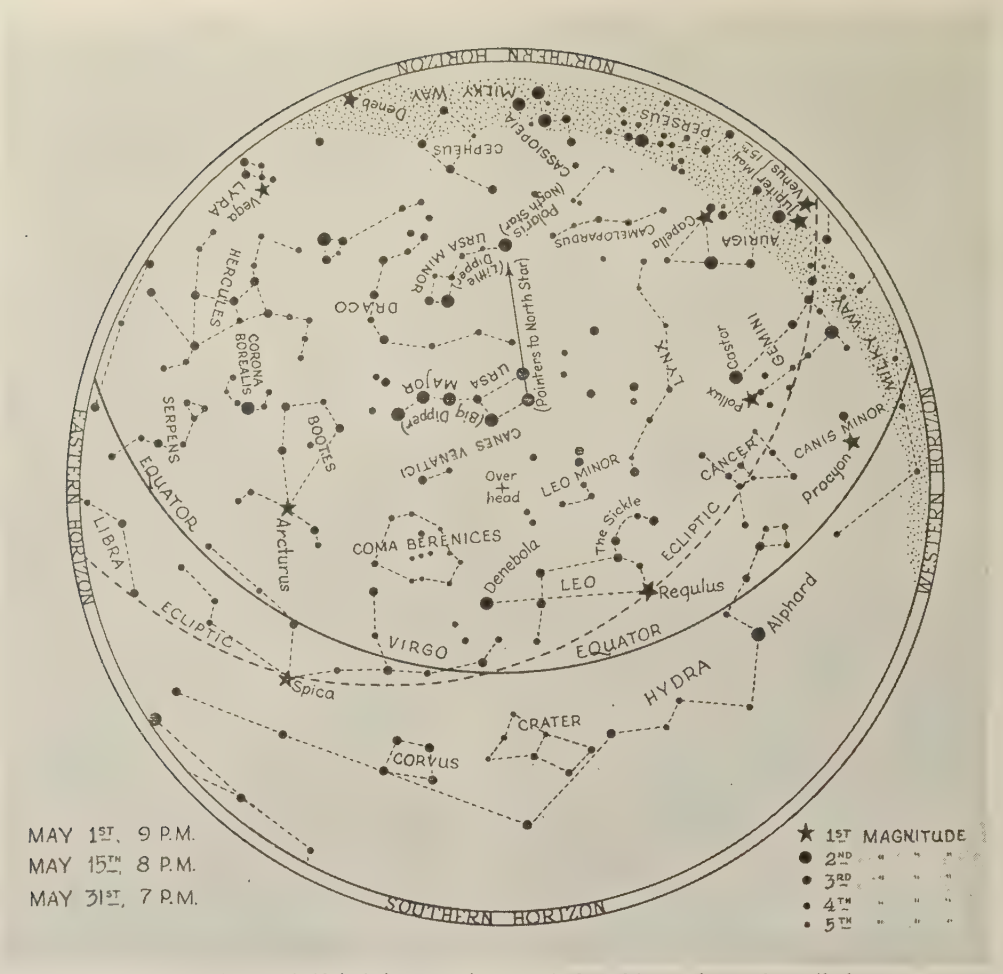
PREPARING THE EVENING MEAL

Thousands spend health-giving days camping in parks amid the lakes

Hoeft Park, Mason County Park, which is just one spectacular and impressive sand dune, and Van Buren Park, in which the dunes are covered with mature beech and maple. The entire nation feel a property in the phenomena these contain.

Just as the future of the parks of Minnesota, Wisconsin and Michigan is bound up with legislative action, so have the present systems evolved, and a straight line has not always been followed. Until 1925, Minnesotan parks, monuments, forests and game work were sprinkled over various government departments; at that time, however, a Department of Conservation was created, to be controlled by a three man commission, consisting of the State Auditor and the Commissioners of Forestry and Fire Protection, and Game and Fish. Powers were given to acquire lands by gifts or power of eminent domain, but no general appropriation has been made, and bond issues are not approved. The sixteen parks have been secured by a variety of methods ranging from general tax levy and condemnation to transfer of state and

(*Continued on page 343*)



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

The Evening Sky *in* May

The Month Marks the Change to Spring Constellations

by Isabel M. Lewis

By the first of May at nine o'clock the last of the winter constellations are approaching the western horizon, or have disappeared beneath it. Capella, in Auriga, is still visible in the northwest, and Procyon, the little dog star, and Castor and Pollux, in Gemini, yet glow in the west; but of the two famous groups of Taurus the Bull and Orion, only the two stars that mark the tips of the horns, and Betelgeuze, remain in sight. Even these will shortly disappear below the horizon.

Vega, in Lyra, is now well in view in the northeast and its brilliant, bluish-white rays are a match in brightness for the golden glow of Capella in the northwest. The three most noted constellations of spring, Leo, Virgo and Boötes, now occupy the center of the celestial stage; Leo has just passed the meridian and is high in the western sky. The kite-shaped group of Boötes, The Herdsman, may be easily recognized in the east with the magnificent Arcturus, of a distinctive orange hue, at its southern extremity. The long rambling constellation of Virgo, with its peculiar Y-shaped configuration, fills the greater part of the southeastern sky. Spica, which represents the sheaf of wheat in the hand of the Maiden, forms a distinctive, equal-sided triangle with Arcturus and Denebola, the second magnitude star at the tip of the lion's tail. Regulus, the remaining first magnitude star now visible, marks the end of the handle of The Sickle, in Leo.

Hydra, the Water-Snake, now stretches its huge, sinuous form entirely across the southern sky below Virgo, Leo and Cancer. The head is marked by a small group of stars in the southwest below the inconspicuous Cancer and the brightest star in Hydra, the second

(*Continued on page 345*)

U. S. FOREST SERVICE

WHERE THE GREAT ICE SHEET CREATED FOR THE FARMER

Wisconsin farmland in the heart of the till plains, where the melting ice deposited finely grained material destined to make wonderful soil for crops

Land of Lakes—How and Why

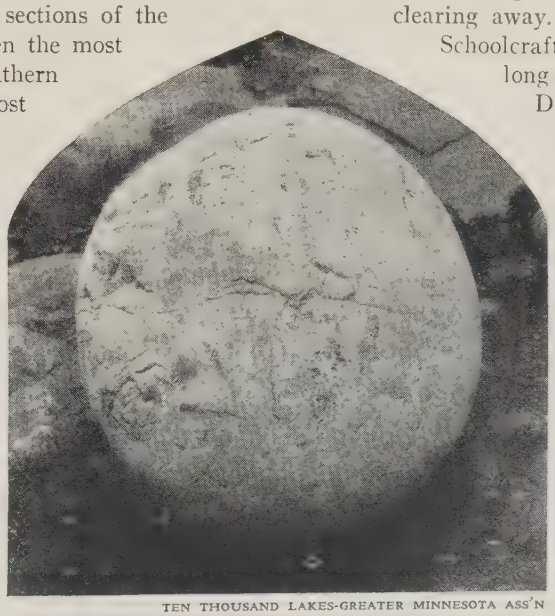
What the Prehistoric Ages Did for Michigan, Minnesota and Wisconsin

by K. C. McMurry

University of Michigan

THE extreme diversity in scenery, forest cover and topography, in population and economic development of different sections of the Upper Lake States puzzles even the most unobservant. Why is the southern part of this region one of the most productive agricultural lands in the country, while the northern areas were formerly the home of one of the greatest timber supplies in the world? Why do lakes sprinkle some portions with the frequency of dew-drops on the grass of a summer morning, and others leave the visitor aesthetically thirsty? Why does an agricultural locality in southern Michigan, for example, gain a valuation of $50,000,000 though unsupported by industrial cities while an equal area to the north is considered worth but $2,000,000?

The answers take us back to the dawn of time, through the mists of antiquity which the geologist's hammer and graphs are slowly clearing away. We must go back long before Schoolcraft, Marquette and Mackenzie, long before the Ojibway, Sioux and Dakota, back to the beginnings of things, to discover the original endowments of the different parts of this land of lakes, forests and rivers.



TEN THOUSAND LAKES-GREATER MINNESOTA ASS'N

THE CAUSE OF POT-HOLES

Stones like this, caught in a vortex of water in days when Lake Superior flowed south through the St. Croix River, bored deep into the rocky hillsides, making queer formations

Among the past events which prepared the background for the present, the fact of glaciation is the most potent influence. It is a very recent phenomenon in a geological sense, however, and one must go behind it to the long series of geological events which took place during the aeons before the Ice Sheets moved south.

Northeastern Minnesota, northern Wisconsin, and the western part of the Upper Peninsula of Michigan

belong geologically to the Laurentian Upland of Canada. The rocks are of very ancient origin, are extremely complex, and have passed through many periods of alteration and change. During the Proterezoic era iron was deposited over extensive areas, and during the millions of years since that time has been concentrated in some sections to form exceedingly rich deposits of ore, especially in Minnesota, which leads in iron ore production, in Michigan, and to a small extent in Wisconsin.

In the Keewenaw Peninsula of Michigan, and to some extent in nearby sections, copper mining has been carried on since the pioneer period—in fact the copper was known and utilized by the Indians. This copper occurs in the native state, scattered through the conglomerates, and in veins. Enormous masses of native copper have been found from time to time, and the region has been of immense importance in the past in supplying the demand of the whole country.

MICHIGAN TOURIST AND RESORT ASS'N

TOPOGRAPHICAL CHANGES IN THE MAKING

A Michigan sand dune, a relentless invading enemy, moves on a wooded section to swallow it up

In Michigan's Lower Peninsula, and in the western half of the Upper Peninsula, as in southern Wisconsin, and southern and western Minnesota, the rocks which appear here and there at the surface, and which underlie the thick deposits of glacial drift, are younger than those of the north, and are of sedimentary origin, laid down in island seas. Broadly speaking these rocks are more or less horizontal in structure, and have been disturbed but little since their deposition. In southern Michigan a very gently sloping basin is present in terms of rock structure, so that the older formations are exposed here and there about the edges of the state, while younger strata appear near the center. In Wisconsin and Minnesota the rocks are of greater age, in general, extending back into the era which followed the development of the Laurentians to the north.

Aside from the iron and copper of the north, these states do not boast an abundance of minerals, but local mineral industries, based upon various rock formations, are significant. Michigan normally leads the country in salt production. Thick beds of salt are found at shallow depths near Detroit, in the Saginaw Bay region, and on the west coast at Ludington and Manistee, while brines from deep wells near Midland and elsewhere form the basis of important chemical industries. In the southeastern part of the Michigan Basin coal occurs over an area of several thousand square miles, and coal mining on a small scale is carried on. In this same basin oil has been discovered at scattered points, and in recent years has been developed considerably. In southwestern Wisconsin the limestones contain lead and zinc, and these minerals have been of large importance historically in the area, and still are produced in some volume. Other minerals are found on a small scale, and building stones are important locally, although the great thickness of glacial drift which covers so large a part of these older formations causes difficulties in mining.

With the exception of a small area in southwestern Wisconsin, joined by a narrow strip across the Mississippi in Minnesota, the whole region was covered by the glacial ice. There were several recurrences of the glaciers but the last great movement was most important. In the lower peninsula of Michigan and the eastern part of the upper peninsula, in southern Wisconsin, and in southern and western Minnesota, the nearly horizontal sedimentary rocks of sandstone, limestone, and shale were almost completely covered by a thick deposit of glacial drift. This body of unconsolidated material, ranging from a few to more than a thousand feet in thickness, is made up of boulders, gravel, sand and clay, in some cases mixed together in a heterogeneous mass, in others more or less assorted and homogeneous. This is the parent material from which the numerous soil types of the present have been developed, and in large part controls the character and value of lands for farming purposes.

The last ice invasion was very complicated. The surface over which it moved, developed through a long period of erosion preceding the glacial period, was more or less rough, with well developed drainage lines. Apparently great river systems occupied the Great Lakes region, with very deep and broad valleys, and cut below the surrounding upland. Instead of one great sheet of ice, moving more or less regularly, and retreating at a uniform rate, as was the case in the earlier invasions in Illinois, Iowa, and adjoining regions, this region was traversed by a number of separate lobes, probably caused by the ice following the previously developed broad river valleys. These were deepened and widened into a close approximation of the present basins of the Great Lakes by the active ice movement. The old drain-

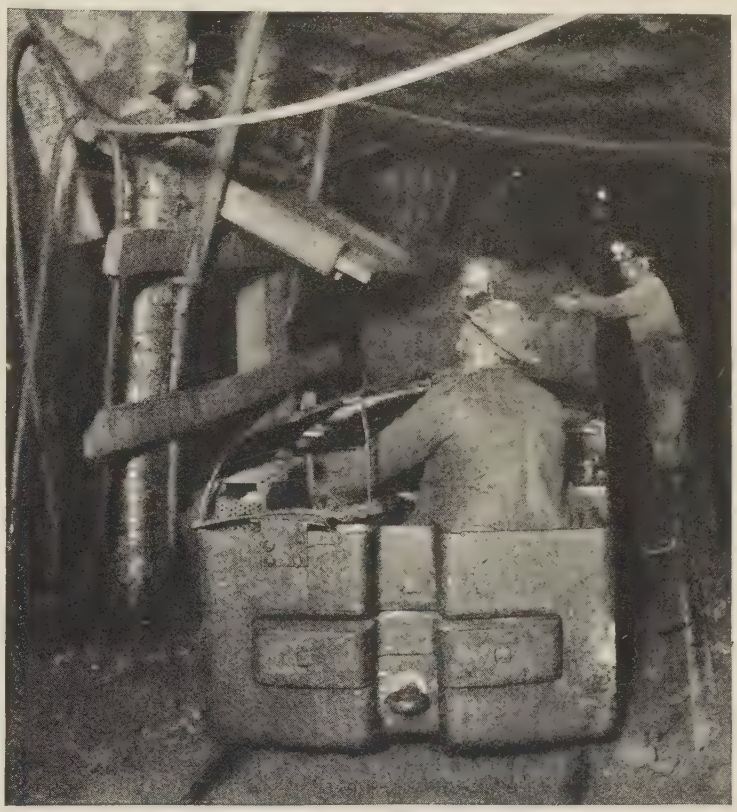
age-pattern, of course, was changed radically, for scouring in one place was offset by deposition in another, and the ancient outlets were blocked. In the case of Lake Superior, and perhaps to some extent in the other Lakes, rock structure also is involved in the basin development, and changes in levels since the retreat of the ice, with tilting on a large scale, have modified the situation to its present character.

The general result of the lobate character of ice movement was a great variety of forms of glacial deposition, in many cases with various types of formations occurring within a small area. Irregularity was further enhanced by the irregular character of movement, for the withdrawal of the ice involved a series of retreats and pauses. For a very long time after this withdrawal, outlets to the north were still blocked, and a series of outlets to the south were developed to include the upper Mississippi, the Wisconsin River, the Illinois, and several others to the eastward. The areas covered by the lakes varied considerably from time to time with changes in outlet, and much country now land was at one time or other covered by lake waters.

Where the ice fronts paused for considerable periods moraines were deposited in irregular ridge-like belts made up of interspersed knobs and depressions. Such moraines contain many sorts of material. Belts of loam soil, so rough as to make cultivation difficult, and to accentuate soil erosion, were formed. Today these lands serve best as permanent pastures. In other places, boulders are so numerous as to make cultivation difficult, while elsewhere deposits of sand account for the poor soils. The principal gravel deposits, so important in recent years, occur largely in moraines. In these belts too, especially in the south, are found most of the small lakes with their resort developments.

The waters from the melting ice carried the finer materials away from the ice fronts, and the coarser materials, sand and gravel, were deposited as outwash plains, as the finer clays and silts were carried far away by the streams. Such outwash plains, though commonly level in surface, have generally poor soils, due to the large percentage of sand. They are developed to their greatest extent in the northern part of lower Michigan, but cover large areas also in the Upper Peninsula, and Wisconsin. Where the ice retreated slowly and regularly, till-plains were formed. These areas were of gently rolling surface, with fine-grained material which later developed into excellent quality soils. Such till-plains correspond to the level areas which are so extensive farther south in Indiana, Illinois, and Iowa. They make up the better farming sections in the southern part of the region, but are much more limited in extent in the north. Areas covered for considerable periods by the waters of the larger Great Lakes, such as the southeastern corner of Michigan, and a large area about Saginaw Bay, were subjected to the work of waves and currents in more or less shallow waters. These lake plains in part furnish excellent soil materials, where clays were deposited, but in the shallower waters sand was the chief material. Where artificial drainage has been developed, some of these lands are highly productive, for the surfaces are level, and easily tilled.

The sandy sections are uniformly poor. The largest lake plain of all, and perhaps the finest land of the whole region, is found in northwestern Minnesota where a great shallow lake, called Lake Agassiz by geologists, covered more than one hundred thousand square miles of territory, an area greater than that of all the present Great Lakes combined. This body of water extended westward into North Dakota, and far northward into Canada, but was very shallow, and in it immense quantities of material were laid down by the ice to the north, and worked over by waves and currents to be spread out into a thick, level deposit of fine grained material. As the ice finally melted away to the north an outlet to Hudson Bay developed, and the old southern drainway through the Minnesota to the Mississippi was abandoned. Now only the few deeper parts of Lake Agassiz, such as Lake Winnipeg, remain, and the level, fine soiled plain remains as the heart of the spring wheat region.



BUTLER

REAPING WHAT NATURE PLANTED AEONS BEFORE

Under ground in a coal mine in Michigan. Much of the Lake States wealth was born before the Ice Age

The Superior Upland, including the western part of the Upper Peninsula of Michigan, northern Wisconsin, and Northeastern Minnesota, had a radically different glacial history. The whole of this country was glaciated, but the conditions were different from

(*Continued on page 345*)

THINGS to THINK ABOUT

A Page Devoted to Conservation from Varying Angles

The Bobwhite in Ohio

Nearly twenty years ago the Chief of the Biological Survey, as a result of intensive studies of the food habits of Bobwhite, suggested that the bird might prove too valuable as an insect destroyer to be killed for food or sport. Evidently the Ohio farmer considered that it was, for in 1915 the Legislature of that State removed Bobwhite from the list of birds that could be shot. In spite of many efforts on the part of its enemies to put the bird back on the game list, this protective law is still in effect.

Now it is a favorite theory among those who wish to kill Bobwhite, that total protection is fatal to the bird, since the sportsmen are no longer interested in its preservation, and starvation and enemies soon reduce its numbers. With this theory in mind, we have been led to examine the records of Christmas bird censuses made in Ohio during a series of years. On these occasions bird lovers, singly or in small parties, make trips through suitable bird territory, walking all or part of a day, and recording all birds seen. These censuses are published each year in *Bird Lore*, the official organ of the National Association of Audubon Societies.

Following are the numbers of Bobwhites recorded by these observers since 1909, the figures for alternate years only being cited to save space.

In 1909, 15 observers saw 54 Bobwhites; 1911: 27 saw 51; 1913: 20 saw 18; 1915: 28 saw 14; 1917: 19 saw 18; 1919: 18 saw 117; 1921: 35 saw 252; 1923: 28 saw 230; 1925: 52 saw 851; 1927: 62 saw 862; 1929: 52 saw 659.

Evidently the Bobwhite in Ohio is prospering under this kind of protection. To those states eager to increase the numbers of birds in their covers, we earnestly recommend Ohio's plan.

Refuges for Waterfowl

Dr. T. S. Roberts, probably our greatest authority on the birds of the Lake States, writing in a recent number of *Bird Lore*, organ of the National Association of Audubon Societies, sounds a warning that may well be generally heeded. In discussing refuges for waterfowl, with special reference to conditions in Minnesota, he says:

"It should be evident to the thinking man that these refuges cannot be also public shooting-grounds or even immediately adjoining such grounds. The average sportsman's view of conservation is to protect only to kill later. This will have to undergo considerable modification and readjustment if our game-birds are ever to be common again. It is not so very long ago that 4,000,000 ducks were killed in Minnesota during two consecutive shooting seasons! This can probably never be done again nor anything like it. But there are still many ducks, and they can be saved and will multiply in spite of drainage and cultivation if they are given a fair chance. Our sloughs and ponds would soon be full of nesting Teal, Mallards, Pintails, Spoonbills, and perhaps some Gadwalls, Redheads, and Ring-necks if the increase were not annually shot off on the opening days and those that escape made wary about returning."

Deer, Dead or Alive

The following is from an editorial in the *Rockford Republic:*

"The *Milwaukee Journal* comments ably upon the fact that more than 240 persons in Chippewa county have petitioned to have the deer hunting season closed. Some day, the editor believes, more than half the population of Wisconsin will insist that the deer season be closed permanently.

"This editorial is in line with the most progressive modern thought which is opposed to the slaughter of wild creatures for sport and in harmony with conservation of such life and beauty as may remain in our diminishing wilds.

"Some day," the *Journal* continues, "we are going to realize that one live deer is worth 100 dead ones. We are going to understand that a tourist and outdoor business that gives Wisconsin $75,000,000 or $100,000,000 income in a year is based on such things as deer and other wilderness creatures, forests, waters and scenic beauty.

"Why then allow an army of 25,000 to shoot it full of holes? Twenty-five thousand guns can do much damage. Yet it is only 1 per cent of Wisconsin's population.

"Why should 99 per cent of the people allow their property to be shot to pieces by 1 per cent?

"That, evidently is being asked in the state. More and more "sportsmen" become conservationists. Instead of just slaughtering they now demand closed seasons—for deer, rabbits, other game. The conservation commission has had many petitions to that effect."

Wild Life Values

From *Parks and Recreation,* Nov.-Dec., 1928, we glean the following: "As the closed seasons are prolonged, men and women will find that the camera is a better hunting instrument than the gun. They will learn that just watching may be finer sport than killing. It takes more woods skill, more understanding to get one good deer picture than many dead bucks. It takes more woodcraft to watch a deer group for a half hour than to bring in dead trophies.

"When and if wilderness creatures become so numerous that they crowd upon our fields and really damage our crops, then there may be an economic reason for killing them. Otherwise upper Wisconsin resort owners, every man who does business with tourists or shares in the $75,000,000 or $100,000,000 of revenue that the outdoor business yields, knows that a single living deer, showing himself to visitors at camp, hotel or cottage, is worth more than any number of dead deer, dragged out of the woods."

Protect the Woodcock

An editorial in *Field and Stream* for February carries the cheering statement that a move to close the season on woodcock is gaining headway. This is indeed good news, for we know of no bird, unless it be the equally persecuted ruffed grouse, that needs the helping hand of the Nature Lover more than does our wood snipe. Reading farther, we note that the editorial opposes any more restrictions on the gunner. The claim is made that woodcock are increasing and the yearly kills in New York and New Jersey are cited as proof. It is not pointed out, however, that these states, situated on the line of flight from the Northeast, the section of the country that now raises the vanishing remnant, are in the front rank of the destroyers of this interesting bird.

This editorial assumes that the Federal Government, which last year reduced the daily limit to four birds, and the season to one month in each section along the bird's migratory path, is ignorant of the true status of the woodcock. It is intimated that the ornithologists, and what are termed the swivel-chair nature students, know very little about this bird, but that the gunner knows all about it that is worth knowing. And every woodcock hunter who believes that the woodcock is increasing is urged to give the Biological Survey the benefit of his experience.

The people who are destroying our vanishing game birds, then, are to make a concerted effort to convince the Federal Government that their victims are prospering under this persecution. While the woodcock hunters are carrying out these instructions, why should not the friends of the dying woodcock have something to say? Was our Federal migratory bird law enacted to protect our birds and so to benefit all our people, or was it framed to assist a selfish minority to destroy our wild life resources? Is it not time that this question was settled?

Billboard Report

Copies of the report of the survey of the roadside beautification and billboard situation in North Carolina are now available for those actively interested in this work. The booklet is entitled "Roadsides of North Carolina" and will be sent in response to requests to the American Nature Association.

Helps and Hints

FOR HOME AND GARDEN

LANTING THE GARDEN, MONTH BY MONTH

By Romaine B. Ware

UR gardens at this season are veritable beehives of activity. Nature is all atingle ith life and we must keep busy every inute. This is the heyday of spring anting. As soon as the soil warms up, e annual seeds may be sown right outde where they are to bloom. Sweet yssum, portulaca, the glorious poppies, chscholtzia, nasturtiums, bachelor's butns, ricinus, and many other things will me along promptly if you do your part preparing the soil well and seeing that ey do not want for water. As soon as l danger of frost is past in your section, e plants of annuals that have been rted indoors may be set out where they e to bloom. Harden them off gradually exposure to the outdoor air during the rm hours of the days and when you ansplant them there will be little setck. A cloudy, cool day is the most rable to set them out and with few exptions each plant should be pinched back induce branching and to balance the top owth with the disturbed root growth relting from transplanting.

In grouping the plants in your borders, oid straight lines and geometric designs. ass them in irregular drifts and groups obtain the most natural effect possible. void all stiff, formal arrangements and the different varieties mingle with each her. The goal is to have a design but avoid all appearance of one. Your design ust locate the various plants in relation each other with most of the taller ones the rear, gradually decreasing in height ward the front of the border where lowowing varieties make the best edging. ere and there taller things may be ought to the front for the sake of variety t throughout the entire border there ould be the informality that Mother ature employs in her gardening.

Many perennials, especially late summer d fall blooming varieties, may be plantnow. Early blooming kinds are best t till fall or at least till after their wering periods are over. With pernials that are planted and left unsturbed for some years, it is important at the soil be well prepared and enriched a goodly depth so that the roots may t want food, at least for a few seasons. sure of drainage in all perennial plantgs as few will succeed if it is poor.

Evergreens may be moved during the ring, from the time frost leaves the ound till active growth is well started. ey may also be moved in late summer early fall, but in the spring the weather day by day becoming better and more rable to their growth. Moisture conions in the soil are likely to be right as throughout so much of the country y summers and falls are common.

A Billion TINY Sponges

"To Hold Moisture and Improve the Soil."

PLANTS are *95% water.* They *must* have *constant* moisture if they are to grow as well as you believe they should. To supply such moisture—to have it readily available in sufficient quantities for plant use day or night as the need arises, requires more than occasional showers or watering.

The *soil* must *retain* moisture; not as a lake or a puddle but within its particles so that roots can get at it. This is the physical condition of the soil and *correct* physical condition can only be attained by mixing organic matter contributing active humus in with garden soil to give it the necessary absorption capacity.

In fact the productive fertility of your soil depends more upon this physical condition than upon fertilizers. If your soil is too sandy, or too clayey, or too loose, or too tightly packed—even if it is chock full of fertilizers that are not dissolved and held in suspension in water ready for immediate use—your plants will not yield flower or fruit as they should.

G P M Peat Moss is the most universally used and approved substance for incorporating organic matter in soil. It is perfectly fitted for holding water for your plants (being much like billions of tiny sponges), admirably adapted for keeping your soil in the "pink" of condition. It will help grow those *wonderful* flowers you've seen but never grown.

Let us send you a trial package containing enough Peat Moss Soil Improver to enable you to make a liberal test.—$1.50 plus 25c postage. We will include directions for using.

PEAT MOSS

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Soil Improver

ATKINS & DURBROW, INC. E-25 BURLING SLIP NEW YORK, N.Y.

THE LAND OF MANY LAKES

(Continued from page 292)

long before the first axe- and plow-armed settlers invaded the forbidding wilderness, still clings precariously to his haunts in rivers and lakes of the north. Gone, or nearly gone, are most of the other species that formed important items of barter, in the days when rum was traded for pelts with the Ojibways and Ottawas, when dishonest traders added equal parts of water to the rum, and the Indians took blood in place of honest dealing. As passed the furbearers, so dwindled the forests; and now even the third great resource, mighty fisheries of the fresh water seas, is showing the strain of intensive methods. It presents one of the most difficult problems with which conservationists have now to deal.

It was thoughts of golden harvests that drew the first settlers to the Lake States. Nor did the southern sections disappoint the hardy settlers who wiped out the hardwoods to make way for their farms. The great bed of lost Lake Agassiz, coated with rich alluvial deposits, today forms one of the most productive wheat lands in the world. Wisconsin is renowned for her dairy products, and the fruit belt of western Michigan is unexcelled. Here, the winds off Lake Michigan retard the coming of spring so that apples, peaches, cherries, grapes and other fruits are late in blossoming, with the result that they escape the danger of late frosts. There are beet sugar areas in Saginaw Basin, and a fringe of the corn belt in southern Minnesota. With the passing of the pine forests to the north, the agricultural frontier was pushed northward throughout the region between 1880 and 1910, but here it met adverse conditions in poor soils, hard marketing situations and a short season; so today, though farms are still being cleared, they are being abandoned at an even greater rate. The future this country holds is closely linked with recreation and reforestation, the one to bring present income, the other to lay the seeds for a rich harvest in generations to come.

Not all the wealthy bounty bestowed upon these states lay above the ground. The most productive iron mines in the world are in the Mesabi range in northern Minnesota, and Michigan and parts of Wisconsin, too, send out red ore for the nation's industries in such great bulk that the world famous locks at Sault Ste. Marie carry annually more commerce than the Panama Canal, due to this commodity and the golden wheat from farther West. The copper mines of northern Michigan are the only important ones in the United States proper. Michigan also has important oil fields and the country's greatest salt wells, while zinc and lead add to Wisconsin's underground wealth.

It is a great land of forest and water, this region of the upper Great Lakes, rich in birds and flowers, trees and wild life. For those who know it, it has an almost irresistible appeal. And like many other states whose past has been bound up in dwindling supplies of forest, fish and fur, it has accepted the beacon of conservation to light the avenues of future time and to prevent missteps in the dark.

The Western Trip

This issue is devoted to the Upper Lake States and there is no wish to encroach upon the available space—which was all too limited for telling the fascinating story of this region—with extended report on the American Nature Association field trips for this summer. May we, however, take this small space to report that the limited groups are rapidly being filled and to urge that all those who are planning to take one of the trips get in touch with Mr. Richard W. Westwood, Chief Editorial Staff, Nature Magazine, Washington, D. C. If you haven't already gotten a copy of On Western Trails, *describing the trips, there are still copies available.*

BIRDS OF HIAWATHA LAND

(Continued from page 296)

or being indifferent to their fate, maintained a two months'. open season from 1920 to 1926; apparently convinced of the need it has closed the season during the past three years. Wisconsin has treated its birds still differently. Close seasons were in force, 1920-1924, but this was followed by three years with a two months' open season, and one year with one month. In 1929, however, the season was closed. As far as state laws can be relied on as evidence, and they must be considered as at least partially indicative of abundance, these progressively restrictive laws point to a declining supply.

The prairie chicken was protected in Michigan, 1920 to 1924, but since then has had a short open season, with the exception of 1928, when the season was closed. In Minnesota the rule has been to close the season in alternate years, with an open season of about two weeks in the odd years. Wisconsin has maintained an open season of four or five days (with a close season in most southern and western counties) until 1929, when the season was closed over all the state.

In the case of the ruffed grouse, Michigan had a long open season, 1920-1924; the open season was cut to one week in 1925 and 1926, closed entirely in 1927 and 1928, and opened for a few days in 1929. Minnesota tried alternate open and close seasons 1920-1924, but has closed the season every year since. Wisconsin, after closing the season in 1920, tried a short open season of usually five days from 1921 to 1927, but still had to forbid killing entirely in 1928 and 1929.

And so goes the story. Is it not plain that these beautiful birds can not withstand the increased toll due to settlement, larger numbers of hunters, and improved transportation facilities? Is it not evident that a changed viewpoint as to values is necessary? It is gratifying to note, however, that in all these states our native game birds are coming to be more appreciated. When it is fully realized that harmless and beautiful wild life belongs to all our citizenry, then shall we learn the true meaning of conservation.

WILDINGS OF THE LAND OF LAKES

(Continued from page 307)

it in springtime,—ranging from the white of Labrador tea, *Ledum groenlandicum*, leather-leaf, *Chamaedaphne calyculata*, and bog rosemary, *Andromeda glaucophylla*, to the deep rose pink of the bog laurel, *Kalmia polifolia*. On the dry pine ridges are close-tangled mats of the bear-berry or kinnikinic, *Arctostaphylos uva-ursi*, and almost everywhere over the ridges the shining leathery leaves and scarlet aromatic berries of the wintergreen. One little plant growing here among the heaths gives delight to all who see it. This is the dwarf cornel or bunchberry *Cornus canadensis*, the smallest of our dogwoods. There is nothing lovelier in all the north woods.

Midsummer brings the flowers of other heaths that are common throughout the pine forests. Among these are the shin-leafs, *Pyrola secunda, chlorantha, elliptica,* and *americana*—all with beautiful and perceptibly fragrant flowers. And at the time when the shin-leafs cease to bloom one has the feeling that summer is on the wane. Another graceful and delicate heath blossoming at the same time as the shin-leafs is the prince's pine, *Chimaphila umbellata*. The prince's pine is not abundant, though fairly common on shady wooded slopes. We should not omit from this category that strange member that in August appears suddenly to have sprung from the earth's rich leaf-mold,—the delicate clear-white Indian pipe, *Monotropa unifolia*. Many of the Indian pipe clusters are of great size and their beauty is worth a day's journey to see, but it is useless to pluck these flowers for in a short time they become a soft black mass. In August, too, is the harvest of blueberries and of wild raspberries, and the roadside splendor of goldenrods and asters.

Of all the alluring places in the north woods the cedar swamp is supreme. A dark and mysterious place it seems to be, the abode of elves and other eery shapes. All around a confusion of deadfalls thickly over-grown with soft green moss. What quaint flowering forms grow here,—tall upstanding orchids, *Habenaria orbiculata*, the dainty mitrewort, *Mitella nuda* clinging to the moss; here in a water-hole robust marsh-marigolds and there by themselves a little group of one-flowered shin-leaf, *Moneses uniflora*. Then just beyond a ponderous moss-grown deadfall we spy the exquisite showy lady's-slipper, *Cypripedium reginae*. And here is the pine-sap, *Monotropa hypopitys*. These lucky finds should satisfy us for the day, but there is one more denizen of these woods that our curiosity prompts us to seek before we return to the trail. It should be found here, and it is—the Lapland buttercup, *Ranunculus lapponicus*, its thickish three-lobed leaves so closely pressed against the moss as almost to defy detection. This is a boreal buttercup of both the Old and the New World, which in these swamps reaches its southernmost range.

Thus the days we spend in these woodlands will reveal to us the abundance of its plant life, and we shall come to look upon the woods with growing appreciation of its secrets.

AND OF THE SKY-BLUE WATER

(Continued from page 299)

utiful and significant as those of mem-
s of his family. No wonder the Sioux
hed to keep his land. But the Chippewa
the land and waged bitter warfare for
And gradually the Chippewa wigwams
placed the tepees of the Sioux on the
e shores.

Just as the lake country was defended
one tribe and coveted by another hardly
re than a hundred years ago, so today,
re is a new alignment of opposing forces
ving for possession. One band is composed
all the out-of-doors lovers who have
r travelled the Middle West and a stal-
rt resident group who see the recreation
sibilities of this land of sky-blue water.
e other is the straggling remnant of the
sters who squandered the natural re-
rces of the Great Lakes country, who
ared away the mighty forests and dev-
ated the wild life with no regard for
morrow. But the lovers of the out-of-
rs will have the victory. The reaction
the waste of two generations ago can be
n in movements to protect watersheds
l restore drained lake country, and in
lanting the vanished forests. The most
bitious of the conservation plans has
n proposed for the Superior Forest
ion of Northern Minnesota. Here are
nd the most marvelous canoe routes
this country, stretching for hundreds
miles through chains of lakes which in
nmer are accessible only by boat or air-
ne. It is a wilderness, but one already
ched by the mechanical age. One pend-
project would convert the group of lakes
ng the Minnesota-Ontario border in the
iny Lake drainage basin into a series
storage reservoirs for power plants
ther down stream.

This power project has met strong resis-
ce. As a counter proposal, conserva-
ists urge that the whole region north
south of the Minnesota-Ontario border
set aside as the Superior-Quetico inter-
ional forest and park. Such action would
serve the lakes from unjustifiable and
conomic spoliation. It would recognize,
never has been done before, the public
reational and scenic value of areas such
are the fortunate possession of Minne-
a, Wisconsin and Michigan.

n summer when the wavelets sparkle
diamonds, by night when moonbeams
he them in silver light, under lowering
s of November, or even when buried
p in winter snows—at all times, the
es and streams are inspiring to look
n. And the charm of Wisconsin, Michi-
, and Minnesota is inextricably bound
in these water courses. It lies in the
ndeur of gorge and waterfall, the quiet
ghter of shaded brooks, the scenic de-
ts of endless lakes winding deep into
recesses of the wilderness where the
s of our civilization have no place. The
liar wild beauty of the larger waters
the north the exquisite grace of the
ands of jewel-like shallower lakes—
comprise a rare heritage such as no
r part of the continent can boast. And
come hundreds of thousands of Ameri-
—who will not be driven away, as were
ioux—to find beauty and contentment
e land of lakes.

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Mountain Saxifrage
Tiarella cordifolia
Foamflower

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Farncombe Sanders—Geranium scarlet	.65	4.50
Inglescombe—Yellow	.60	4.75
King Harold—Ruby crimson	.60	4.50
Mrs. Potter Palmer—Glowing purple	.75	5.75
Pride of Haarlem—Giant carmine red	.60	4.50
Princess Elizabeth—Deep pink	.60	4.25
Professor Rauwenhof—Cochineal rose	.60	4.50
Rev. Ewbank—Heliotrope lilac	.70	5.25
The Sultan—Maroon black	.60	4.50

	Doz.	100
Bronze Queen (Breeder) Golden Bronze	.60	4.50
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MICHIGAN SETS GREAT EXAMPLE TO NATION IN MEMORIAL FOREST PLAN

To the Lake States and to the nation a fine example in reforestation is being set by the Detroit *News*. The State of Michigan owns 1,390,000 acres of denuded, cut-over forest lands. Of these, 453,000 acres are in established, administered state forest reserves. All need reforestation. With this fact before it the *News* inaugurated a memorial forest planting campaign and called upon its readers to subscribe to units in the planting program. About 138,000 took part in the plan. School children subscribed dimes and individuals hundreds of dollars. The sum of $25,000 has been donated to date. This means that 10,000 acres can be planted, for the amount is sufficient to cover all labor costs for planting.

The plan, which was first announced September 22, 1929, allows any citizen or organization to finance the planting of a 40-acre pine forest on land in one of the 12 state forest reserves by paying $100. The State will care for the seedlings after they grow to maturity. This care includes protection against fire and against insects which harm trees. The state forest reserves will remain forever the property of the State, and in 50 to 100 years, when the trees have reached a marketable size, they will be scientifically harvested for the benefit of the State.

Planting and field operations began in the 12 state forests on April 15 under the direction of State Forester Marcus Schaaf. For the first time in the history of the State sufficient money is now available to plant, at one time, 10,000 acres of denuded, idle public lands to pine trees.

This planting, the largest seasonable planting that has taken place in the 12 state forests since their establishment in 1904, means that over 10,000,000 white, Norway and jack pine seedling trees will be started on their way toward maturity through the interest displayed in reforestation by citizens of Michigan.

The 10,000 acres are distributed throughout the 12 state forest reserves located as follows: Houghton Lake Forest Reserve in Roscommon County, Fife Lake Forest Reserve in Kalkaska County, Lake Superior Forest Reserve in Luce County, Ogemaw Forest Reserve in Ogemaw County, Presque Isle Forest Reserve in Montmorency County, Alpena Forest Reserve in Alpena County, Pigeon River Forest Reserve in Otsego County, Black Lake Forest Reserve in Cheboygan County, Hardwood Forest Reserve in Charlevoix County, Mackinac Forest Reserve in Mackinac County, Au Sable Forest Reserve in Oscoda County and the Higgins Lake Forest Reserve in Roscommon and Crawford counties.

These 12 units are now all under forest management and embrace 453,000 acres, 80,000 acres of which have been added to the reserves since the inauguration of the *News* plan.

All contributors to this plan will be notified as to the exact date of the beginning of the plantings upon their forest plots. All who care to may journey to these forest reserves and participate in planting the first trees on the areas set aside for them.

Col. George R. Hogarth, conservation director of Michigan, who has charge of all state conservation activities says: "It is gratifying to know that we were to be given some assistance in our program of reforestation. I had no idea of the wide appeal of the project. The mere fact that your readers and contributors have donated $25,000 during the first five months the plan has been in effect is sufficient evidence of its success and its appeal to a far-sighted commonwealth.

"It is highly gratifying to learn of the splendid response of the school children, civic organizations, women's clubs and patriotic individuals who apparently sense the economic benefits certain to accrue to Michigan through forest renewal."

These forest plantations will be set aside as memorials in the names of their donors or anyone they care to honor. The Detroit *News* will erect a metal sign on each plantation carrying the number of acres planted, the donor's name and address, and the name of the individual, organization or institution commemorated.

Donors are informed of the exact location of each plantation as soon as the State makes its selection of tracts to be planted.

Contributions from Upper Peninsula residents will be used for planting pine trees in the state forest reserves in Luce and Mackinac counties; those from the Lower Peninsula in the 10 state forests below the Straits, or in other forest reserves as established.

The plan is an enduring one and will continue from year to year with plantings taking place each spring and fall. Each seasonable planting will take about two months. The capacity of the pine tree seedling nursery, at Higgins Lake, is 25,000,000 trees for 1930, 40,000,000 for 1931, and this will be increased each year to meet whatever planting program is assured.

There are many states in which the same forest planting plan would be a great success if taken up by a public-spirited newspaper in co-operation with the state foresters, according to Charles Lathrop Pack, president of the American Tree Association. The memorial appeal is a fine one and such a campaign has the added value of putting before the people of a state the exact situation as to their forest resources. At the same time it allows the people to help directly in correcting a situation that needs correcting if there is to be security in our economic scheme.

Gives a Michigan Forest to Purdue

Chase S. Osborn, former governor of Michigan, and a graduate of Purdue University, has presented 5,200 acres of virgin hardwood lands in the Upper Peninsula to his alma mater. The lands are in Chippewa and Luce counties, well located for economical logging and lumbering or the practice of forestry.

"It is a great-hearted gift from a great-hearted man," said President Elliott of Purdue in a statement announcing the benefaction, "and it will add immensely to the power of Purdue."

The story of Chase Osborn, reporter, newspaper man, iron hunter, discoverer of the Moose Mountain iron range in Ontario, world explorer, governor, has been an inspiration to many an Upper Peninsula boy. He was born on a farm near Warren, Indiana, worked his way through school, walked the ties to Chicago and got his first job with the Chicago Tribune. *The value of Mr. Osborn's gift to Purdue University is greater twice over than the original endowment by John Purdue, the founder.*

NATURE IN PRINT

Another Holiday

We have before remarked that Edith M. Patch has a fine faculty for presenting Nature facts in fascinating fashion for youthful consumption, and this remark is further supported by her latest book, *Holiday Meadow*. This is a companion volume to *Holiday Pond*, and as the first book dealt with the life found in the water so this newest one deals with the life in the nearby meadow. They are little stories about what one finds in the meadow—any meadow—and calculated to stir avid interest in the young reader the next time a meadow is encountered. The book is published by Macmillan and is illustrated with photographs.

Elementary Science

In bringing out their series of elementary science readers D. Appleton and Company have not worked in numerical order and now, last, comes Book One in the series of readers known under the group title of *Elementary Science by Grades*. The co-authors are Elizabeth K. Peeples and Ellis C. Persing. They have done an excellent job with a very difficult subject. The preparation of a primer in this field means much careful weighing of the subject and much wise selection. This the authors have obviously done and perhaps that explains why the first should be last. We are pleased to recommend this series of readers.

Nature Biographies

One of the popular features of Nature Magazine is the frequent biographical article about naturalists, past and present. Biography is, generally, very popular at the moment anyway. Quite apropos, therefore, is *American Naturalists* by Henry Chester Tracy. This is a volume containing concise and fascinating sketches of twenty-one men and women whose names are writ indelibly on the pages of American natural history. Some are alive today and some have passed away, but the selection is interesting and catholic. Mr. Tracy's handling of his subjects is charming and he presents us with a book well worthy the having. The publishers are E. P. Dutton and Company.

For Trout Fishermen

Fishermen who love to play the trout will welcome *Taking Trout with the Dry Fly* by Samuel G. Camp, which the Macmillan Company has published for the instruction and delectation of the Waltonians. This book seeks to present the latest information about developments of rods, flies and other tackle as well as how, why and when to use the dry fly. Mr. Camp writes out of a wealth of personal experience. The book is listed at two dollars.

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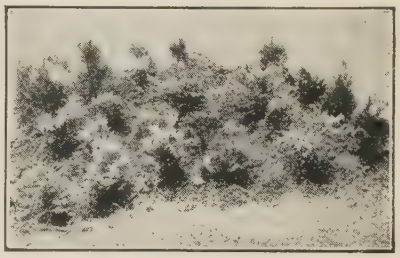

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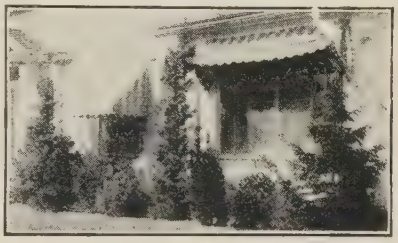

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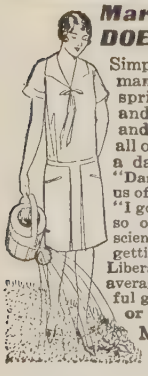

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GARDENING IN THE NORTHLAND

(Continued from page 321)

become deservedly popular,—the mock orange and the hawthorn.

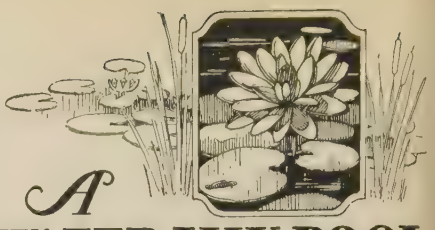
Conventional or formal gardens have never been popular in the lake states, and today, more than ever, is the period of striving for naturalistic effects. Even the farmer is wanting to know how he can naturalize the wild flowers in his home yard, and many city dwellers have already succeeded.

Nearly a hundred wild flowers have been brought under cultivation with satisfactory results. A great many have responded amazingly to cultivation, and have been improved by a process of selection. Two striking examples are the black-eyed susan and the orange butterfly-weed. In open sunny situations, success has followed in the cultivation of wild bergamot, evening primrose, and the rattlesnake master, *Eryngium yuccaefolium*. In the shade spots many have had unusual success with a dozen native ferns, such as the shield fern, common polypody, oak fern, maidenhair fern, lady fern, woodsia, ostrich fern, cinnamon fern, and royal fern. Some have succeeded also with Dutchman's breeches and with native orchids.

Rock garden devotees have had the best success with wild flower naturalization and have found many species that fit admirably with this kind of garden. Two native cactuses—Rafinesque's prickly pear and the fragile prickly pear—thrive under cultivation. The Indian paint brush, various sedums, beard-tongues, *Pentstemon,* and native campanulas are all at home in our rock gardens. Accompanying ponds will harbor native cattails, blue flags, arrowheads and pond lilies. Though the northland is in the infant class in rock gardening, this has already become so popular that materials cannot be obtained rapidly enough.

Exploitation of native flowers and shrubs by commercial interests shows that we must make haste to save a portion of that native beauty before it is too late. When a single annual outdoor show draws upon northern Wisconsin for two solid carloads of trailing arbutus for a week's fleeting pleasure, it becomes apparent that Nature cannot forever stand such a drain unassisted. That example is conspicuous only by its size. Florists all over the country are buying regular shipments of trailing arbutus in season. The answer should be its cultivation for a commercial crop. If the demand is for wildlings, then gatherers must be taught not to rob the public domain, but to raise their own stocks. A far-reaching law signed by Gov. Walter Kohler, of Wisconsin last July, makes it a heavily finable offense to trespass without consent of the owner, putting the burden of the proof upon the trespasser. That furnishes the necessary protection to the farmer who wants to grow wildlings, and the quicker he starts using this advantage, the sooner will his lot be bettered. There are frequent examples where the growing of Christmas berries, flat ferns, trailing arbutus, winter berries and orchids of many kinds has been most profitable.

The same story can be told in all three states. People are getting a tremendous amount of enjoyment out of gardening in the northland.



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Send for FREE illustrated booklet; tells how to build pool or plant tub garden; describes Water Lilies, Aquatic Plants, Ornamental Fishes.

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Easiest and quickest way to water your lawn or garden. No need to waste summer evenings holding a hose. A Shower Pipe puts an end to this tedious work. Eight feet long (two 4 ft. sections) with four sprays. Sprinkles a 10 x 20 ft. area. Reaches every nook and corner. Does away with all hand-watering. A modern sprinkler for the busy man. No moving parts to wear out. Buy a Shower Pipe and you'll never have to buy another sprinkler. Thousands in use. Guaranteed. Low priced. Write for circular.

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Rocky Mountain guide

in new and fascinating out door programs. (beautifully illustrated)

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Haunts and habits of birds!
Timberline and the alpine flowers beyond!

New lecture on CORNWALL; weird, mysterious, rugged. Bird and animal life abundant. Pasties and cream; prehistoric ruins; tin mines and china clay pits; Scilly Isles, harboring dolphins, seal, guillemots, auks, puffins, etc. Mr. Caldwell spent four years in the "Delectable Duchy".

Subjects

1. Wild Life in the Rockies.
2. Bird Songs and Wild Flowers.
3. Trees, our friends and neighbors.
4. Color Symphonies of the West.
5. Cornwall, mysterious, rugged, colorful.
6. Grand Canyon of the Colorado.

Ask for folders on boys camp and cabins for adults in the Rockies.

American Nature Association

15 Boudinot Street

Princeton, N. J.

(Continued from page 323)

trunks. A whole story could be written about the beetles which infest a single tree. The black oak plays the host to a succession of insects which cause its destruction by an orderly division of labor and a division of the spoils.

A Buprestid beetle, *Agrilus arcuatus,* is one of the first to start the attack. The larvae bore into the tops of the branches and girdle the twigs. Another species of *Agrilus, A. bilineatus,* works in the standing trunk while it is still in its prime and eats out narrow channels under the bark. Then several species of flat-headed borers enter the trunk and feed among the burrows left by the Buprestids.

Such agents open up the tree's defenses to a horde of other insects that soon follow up the attack. The beetle population increases with the advent of the larvae of click-beetles and darkling-beetles. Then when the underlying sapwood begins to rot, millipedes and centipedes, fungus flies and spring-tail invariably join the mob of destruction. Carpenter ants, wasps and bees excavate their nesting chambers from the rotting wood. Finally the combination of physical and biotic agents completes the ruin and the tree is reduced essentially to soil.

In the stable forest environment, Nature is generous to insect life and offers it an easy existence, but on the sandy, unprotected dune regions conditions are vastly different. On the shores of Lake Michigan and in certain localities in Wisconsin and Minnesota there are barren sandy areas where only such insects can live as are especially fitted for such an environment.

The most conspicuous of the dune insects are the solitary wasps. Here the stocky Bembicids range about capturing flies, and the angular Psammocharids hunt spiders, even dragging the fierce Lycosa from its lair. Here Chlorion chases grasshoppers and Ammophila collects caterpillars. By burrowing in the sand they establish their larvae in underground nests as safe as any cyclone cellar.

Depending on the wasps for existence are the Mutillids or velvet "ants". The male possesses wings, but the female has none. She scurries about on the hot sand, slyly slips into the burrow of a digger wasp and inserts her egg within the cocoon of the defenceless host. Her trade is parasitism.

On the dunes, the wary tiger-beetles actively stalk other insects for their own food, while their larvae sink long straight shafts into the sand and prey upon any insect that steps close to the doorway where a pair of huge jaws is ready for the kill. Geopinus, another beetle, ranges the sand only at night. During the heat of the day it lies discreetly hidden lest it suffer the wrath of the Sun God.

These are a few glimpses of insect life in the Land of Lakes. A complete census would reveal creatures of all sorts and dispositions: exquisite children of the air, grotesque devotees of the soil, warlike waifs and peaceful sprites, shy ones, bold ones, good and bad,—to get along with them all is hard indeed, but to get along without them at all—I wonder, could we really manage it?

Bring the glory of the hills to your home

NOTHING is more beautiful than the glorious spring blooms of Rhododendrons and Azaleas—modest white, soft orchid pink to orange yellows. Our nursery-grown native Rhododendrons can come to you at very reasonable prices. Catalog on request.

Special offer for $25 includes 12 plants, 1 to 3 feet high, ten different, enough to cover 25 to 40 sq. feet. The blooms are from white to orange, April to July—a wondrous series of blossoms.

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Price for this superior collection only $25, packed, f. o. b. Stroudsburg. Please send check with order.

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Visitors welcome to nursery. Write for full list of shrubs in this offer.

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BY asking us, you will be getting dependable help from the largest Hardy Plant Nursery in the country. We shipped over 4 million plants last year. That's how big we are. All plants field grown, sturdy stock, blooming the first year in your garden. Need no coddling. Send for our Hardy Plant Catalog. Tell us what your problems are. We'll help you solve them.

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This Modern Invisible Rose Spray
ACTS LIKE MAGIC

BIGGER BLOOMS, more vigorous foliage result from roses sprayed with Fungtrogen. Cures sick rose bushes. . . . Wind and insects spread the spores of Mildew and Black Spot—the two worst enemies of the rose. The invisible Fungtrogen spray soon checks these diseases. Does not discolor leaves. . . . Easy and pleasant to use. Simply mix with water and spray. Economical! Half pint makes 15 quarts of spray. Leading horticulturists enthusiastically endorse it. Prepaid: half pint $1; pint $1.50. At your dealer's or send check.

Use complete plant treatment. When insects appear on your roses or other plants use APHISTROGEN (kills aphis—plant lice); and INSECTROGEN (kills leaf-eating insects). These sprays are chemically harmonious with FUNGTROGEN. Be sure to use complete treatment.

Write for free booklet, "Black Spot Control."

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Three to five-year-old trees.

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8 EVERGREENS . . . $1.80
2 Norway Spruce, 2 Arbor-vitae, 2 Scotch Pine, 2 Junipertus Communis. Trees are 5 to 6 years old.

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(Maximum Rosebay), pinkish white flowers. (Catawbianse), flower is reddish purple. (Carolimanum), dark pink. Three Plants. **$1.10**

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Foliage blue, Silver tint **Cedrus Deodora** A beautiful evergreen tree
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HARDY AZALEA (Nudiflora) A handsome, early, free-flowering deep pink species; very profuse and showy. A beautiful variety. Very hardy. Blooming age. Each **$1.10**

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Japanese Barberry one foot high, 6 plants	1.10
Sweet Williams, all colors. 10 plants	1.10
Hardy Chrysanthemums, assorted. 6 plants	1.10
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Painted Daisies, 10 plants	1.10
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Delphiniums, Dark Blue, Light Blue, 8 plants	1.10
Oriental Poppies, brilliant colors, flowers 8 inches across, 10 plants	1.10
Columbine, beautiful colors, 10 plants	1.10
Fox Glove, assorted colors, 8 plants	1.10
40 Novelty Snapdragon plants, assorted; large supply	1.10
40 Aster plants Exhibition Type, assorted; large supply	1.10
25 Calendula plants, Orange King	1.10
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40 Pansies, giant flowering mixture, beautiful markings (in bud)	1.10

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EVERGREEN SHRUBS Rhododendron and Mountain Laurel
2 to 4 ft. 25—$6., 100—$20. Hemlock 2 to 4 ft. 25—$6., 100—$20. Fancy Holly 2-4 ft. 25—$8. Write for our wholesale price list.
Forest Evergreen Co. Box 29 Doeville, Tenn.

FLOWERING EVERGREEN SHRUBS, 2 to 4 ft., 10 Rhododendron, 10 Mountain Laurel, 10 Hemlock, 10 Fancy Holly, all for $10.00 or 25 for $6.
Doeville Collection Co., Doeville, Tenn.

MAMMALS OF THE LAKE STATES

(Continued from page 304)

farmer's fields of rodents and other small animals, and sometimes raids his chicken coops. The pygmy of the family, the smallest of all flesh-eating animals, only seven inches long, occurs rarely in southern Michigan and southern Wisconsin, and somewhat more commonly in western and northwestern Minnesota. The slender form of the least weasel admits it to the burrows of the various meadow mice, and on these it subsists.

The beaver, builder of dams, is locally abundant, and of late years artificial transplanting has helped it to reoccupy much of its former range. The muskrat and he of the powerful defence, the skunk, are numerous, and along the southern boundary of Minnesota the smaller spotted skunk finds its northeastern limits.

The hard-fighting, thick-set badger, who has lent his name to make a nickname for Wisconsin, where he is fairly common, is also a denizen of Minnesota. His habit of feeding on gophers, ground squirrels and other small burrowing animals more than balances the damage he causes by digging treacherous homes in roads and farmlands, and he deserves the protection he does not get.

The cottontails flaunt their white tail-pieces over the entire southern and central parts of the three states, overlapping the range of the longer-eared, varying or snow shoe hare of the northern regions. The porcupine, of dour mien, who always seems to be minding his own unhurried business, is an abundant species over the northern parts.

Minnesota, Michigan and Wisconsin, in their deep forests along the shores of their lakes, and throughout their plains and farmlands, harbor a host of smaller mammals, not so prominent as the larger members of their class, but still considerably important in an economic survey. The white-footed or deer mice, jumping mice, pocket gophers and voles are common over the entire area.

Several species of semi-terrestrial, semi-arboreal squirrels abound. The noisy, complaining chatter of the red squirrel, or chickaree, is a common sound of the woods and forest life. Those animate volplanes, the flying squirrels, are found over the entire section, a larger form occupying the northern parts.

Side by side with the squirrels are found the chipmunks of two species—the gray

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100 HYACINTHS all colors	$9.75 prepaid
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sent free to gardeners who want complete, intelligible descriptions of new varieties. Lists a careful selection of standard iris including the famous Williamson originations.
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Evergreens, Rhododendron Max., Kalmia, and Hemlock, Seedlings 6 to 18 in., 100, $6; 2 to 4 ft. 25, $5; 100, $18; Carload for $150.00.
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A Practical, Proven Power Cultivator for Gardeners, Fruit Growers, Truckers, Florists, Nurserymen, Suburbanites, Country Estates and Poultrymen.
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striped over the entire territory and the Lake Superior chipmunk on the colder northern ground. Their relative, the thirteen-lined ground squirrel, is native to the southern parts of Minnesota and Wisconsin, and is replaced or accompanied by Franklin's ground squirrel in western Wisconsin and Minnesota. The woodchuck, the ground hog of February 2nd fame, is widespread.

Among the lesser fauna in the northern parts of the three states must be included several shrews, and that interesting little oddity, the star-nosed mole, burrows his winding passages in every district. The prairie mole is confined to the southern sections.

Of bats there are six: the little brown, Say's, silver-haired, large brown, red and hoary. It is possible that two other more southerly species occasionally may be seen in this area, the Rafinesque and Georgian bats.

The mammalian glory of the dim far-stretching ages before the advent of man has long since past. Giant sloths, elephants, mastodons, camels, llamas, various types of horses, sabre-toothed tigers and the giant beaver of the Pleistocene, *Castoroides,* here once made their home. The remains of the Proboscidians are constantly coming to light in various parts of these states.

The great prehistoric creatures passed, however, because they were no longer adapted to the changing conditions on the face of the earth. But no period of the same length since the Ice Age saw such wholesale and thorough destruction of mammals as did that period opened by the coming of the hunter and closed by the Twentieth Century.

Now, however, the third picture is being formed on the lake dotted tableau that comprises the surface of Wisconsin, Minnesota and Michigan, the picture of a mammalian life prolific, well-protected; of natural resources faithfully replenished and wisely consumed. The artist is a powerful influence. Men call it conservation, the Prophets called it wisdom.

Michigan Outdoor Show

Michigan's first Outdoor Life, Motor Boat and Sportsman's show is being held in Convention Hall, Detroit, the week of April 20. All phases of outdoor recreation are combined in one big exposition, and huge crowds are expected to view the exhibits of boating, fishing, camping, golf, archery, tennis and other aspects of open air sport.

WHERE WHITE PINE ONCE WAS KING

(Continued from page 313)

to five and one-quarter million acres. This movement is putting upon the tax rolls thousands of acres that until recently were bankrupt and paid no taxes.

The national forest program for the acquisition of two and one-half million acres in the region is being gradually carried out. The counties in Wisconsin are turning their tax-delinquent land into county forests. The states, particularly Michigan, are blocking up their holdings of state forests. Michigan leads all the other states in

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100 Large (1" to 2") Vermont Bulbs $3

This collection includes at least 35 fine varieties, in many shades of Red, Yellow, Pink, Blue, Orange, Smoke, White, all good ones but not labeled as to name. 50 for $1.75. *All sent prepaid* with complete instructions for growing prize-winners. I believe this to be the finest "glad" collection offered anywhere.

Specialty Collection

Annie Laurie, exquisite ruffled Pink; **Emile Aubrun,** large bronze; **Apricot Glow,** beautiful Apricot-colored; **Golden Dream,** finest clear yellow, **Marnia,** very large Orange. All five rare varieties—labeled, $1. (regular $1.50 value). Both collections prepaid, for $3.85. Send for illustrated catalog "that is different", listing over 300 of the world's best varieties.

5 BEAUTIFUL RARE VARIETIES $1.50 VALUE $1

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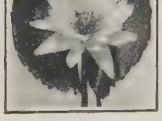
Choose from Our 75 Varieties of Beautiful WATER LILIES



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Glads—Such beautiful varieties as **America, Francis King, Alice Tiplady, Maiden Blush, Marshall Foch, Peace,** etc. Elegant in borders or large beds. Fine for cut flowers.
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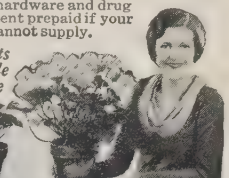

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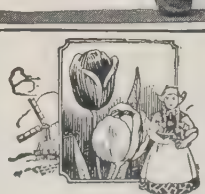

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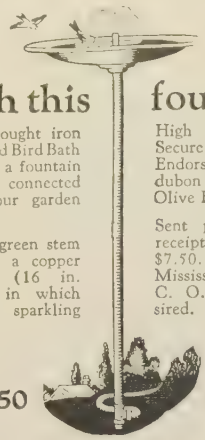

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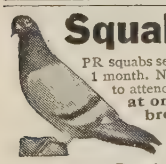

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a program of reforestation. Some forty-two thousand acres have already been planted by the state, and ten thousand acres are added annually. Several pulp and paper companies in Wisconsin have started on a program of reforestation. Even the lumbermen, under the more liberal forest tax laws now enacted in all three states, are turning toward selective logging as a means of perpetuating their forests. All three states are taking an inventory of their lands. The public sentiment is strongly behind the national and state forest programs, and is aroused to the need of liquidating the cut-over problem.

Out of all these efforts there is arising a new forest in the region. It will probably never be like the virgin forest. At first it will be a forest of aspen or jack pine. These trees already yield wood for pulp, fence posts, railroad ties, and box lumber. As time goes on and the forest now being planted approaches maturity, industries using its products will develop throughout the forest region, just as industries grew out of the old lumber industry. These industries, however, will be built to stay, because, taught by the bitter experience of the past, the new forest will not be destroyed as the old was, but will be handled on a permanent basis. The balance of Nature destroyed by reckless cutting and fires will be re-established. The forests will become again the home of wild life. They will restore the disfigured beauty of the northland and will furnish more and more a quiet refuge for the busy man from the city with its noise, bustle and worries, characteristic of modern existence. They will help regulate climate and guard streamflow. They will be the backbone of the recreation movement.

This transformation of the desolate cut-over land of the region is just at its beginning, but its future is full of promise. It is bringing out a new type of leadership and a new pioneering spirit, not the leadership of the past which was bent upon "opening up" new country and "developing" new resources regardless of consequences, but the leadership for creating new resources and carefully husbanding them for permanent use.

FINS OF THE INLAND SEAS

(Continued from page 317)

summer visitors have gathered in growing numbers around the shores of the lakes, penetrating even to the remote water bodies of the vast northern tracts made desert by the lumberman. The money left behind by the summer tourist is reckoned in terms of millions.

Before the white man came, fish abounded everywhere, All the lakes and streams were choked with finny denizens, as are today the few virgin waters that remain to relate the story of the past. But the white man has wrought fearful changes. In the Great Lakes the fishing industry now faces ruin.

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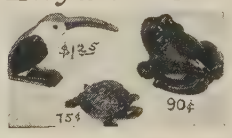

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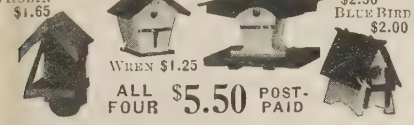

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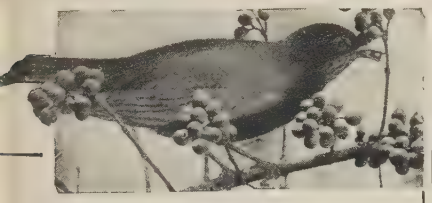

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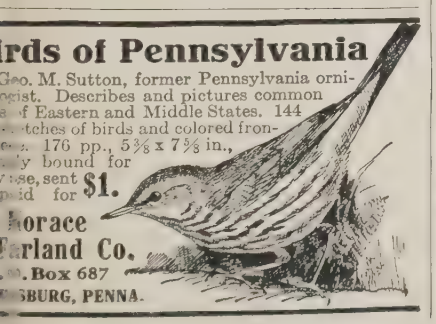

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Many species that once supported lucrative fisheries are extinct. Only the high price paid for all fishery products sustains the industry. Once seining along the shores supplied the demand but since about 1840 the history of the fisheries has been marked by the continued improvement of gear, by the catching of smaller and smaller fish, by the extinction of species whose numbers, like the trees of the forests, were considered inexhaustible, and by the exploitation of species originally considered unfit for food.

In general, unrestricted fishing has been responsible for the decrease; there has been no limit on the number or size of fish that could be caught nor on the time of the year they could be taken. There are now bag limits, size limits and closed seasons that apply to streams and inland lakes, but commercial fishing is restricted virtually only by laws governing the size of the fish that may be sold.

Coupled with these agencies of destruction is another more powerful still—the poisoning of the water. In lumbering days the streams were modified to transport logs and very often they were choked with sawdust. Later with the growth of cities the dumping of sewage, frequently laden with deadly industrial wastes, has made foul and barren once beautiful and productive water courses.

There is an awakening interest in the conservation of these resources. Protective measures are growing and are being enforced. Much money has been spent in restocking the waters and some success has been attained. With the adoption of intelligent procedure in such activities further successes may be hoped for. The ultimate that the conservationist may look forward to is within his vision. That achievement in the end may be disappointingly little and only ceaseless struggle can maintain it.

ACRES OF SUNLIT WEALTH

(Continued from page 327)

and Federal lands. Though Minnesota has spent as much as Michigan on her parks, her lack of definite plans and standards has left her with the poorest park system of the three states and several low-grade parks. She needs a state survey of the park situation, and many consider that she would be bettered by the concentration of park supervision in the hands of a responsible executive who can advise the Commission with expert knowledge and give full time to the development of a proper system.

Wisconsin's State Board of Forestry was established in 1905, and before the Supreme Court prevented further acquisition of forest lands in 1915, it had set aside more than 150,000 acres. A Conservation Commission of six members appointed by the Governor, serving without salary, took over its power in 1927. This Commission supervises the work of a Director of Conservation and a Superintendent of Forests and Parks. A

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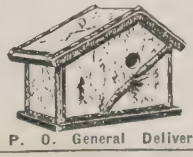

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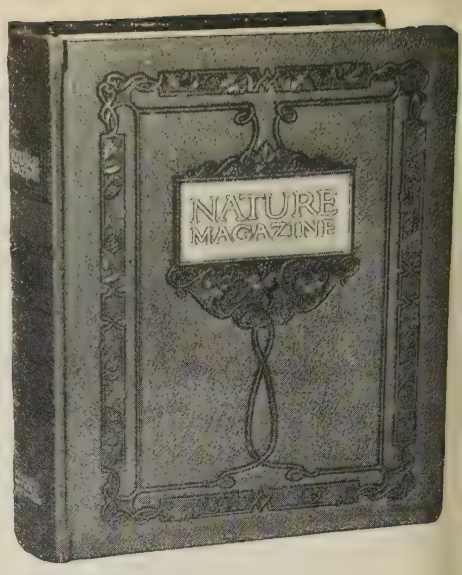
definite policy, strictly adhered to, that only unique, outstanding and historic areas are of park status, has meant that the eleven parks of the State are all areas of great natural beauty, offering the best in fishing, hunting, camping and other forms of recreation. Lands may be acquired through purchase, gift, and power of eminent domain. Contracts with landowners by which the state may control their land may be made. Further acquisition is restricted only by the degree of generosity of the legislature. During the past two years, however, three important legislative measures have failed. They were bills for the creation of the 7,800 acre Northern Lakes Park, in Sawyer County, the Seven Pines Park, in the North, and the Kettle Moraine Park, which includes rolling wooded country and beautiful lakes. Even with these reverses, however, Wisconsin's park system is rapidly taking excellent form.

No state in the country, except New York, has given greater support to its park system than Michigan. It has been a pioneer in the field. In 1919, it established a State Park Commission of ten men to serve without pay, and arranged their terms of office so a large majority of experienced men would always carry over. When the Department of Conservation, headed by a commission of seven appointed by the Governor with the Senate's advice, was established in 1921, the powers of the State Park Commission were transferred to it, and a Superintendent of Parks hired to advise and administer. The Department has probably as broad powers as any conservation group in the country, for it can sell, purchase, exchange or condemn lands of its own authority. Since its creation, it has acquired sixty-six of the sixty-seven Michigan parks, and now controls 1,000,000 acres of land. All the additions made were achieved not through purchase alone, but through gifts or transfers from delinquent land supplemented by purchase. Michigan's system has been inexpensively built. She alone has a division for state parks in her government, and a full-time superintendent.

Practically every variety of natural scenery found in the state, except Upper Peninsula virgin forest land, is found in Michigan's parks, and efforts are being directed to make up the lack, as well as add park frontage on the Great Lakes, several sand dune areas on the lake shore, large areas of swamp and lowlands to conserve wild fowl and migratory birds, and a 20,000 acre tract in the Porcupine Mountains. Another proposed park of large size includes the Pictured Rocks along Lake Superior.

President Hoover once said, "The day is coming when there is going to be a premium on solitude. If a man can find a piece of land anywhere in this country where he can't hear a bell ring or a whistle blow, that's the place he'll want for a home." The Lake States cannot provide such homes, but they can provide such camp-spots. Minnesota has hardly tapped her park resources; Wisconsin is just beginning, and even Michigan, the most mature of the three, has yet much work to do. But even now these Lake States have given generous guarantees to their citizens, by their park systems, that the time will never come when a man cannot find solitude within their borders when he wants it.



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THE EVENING SKY IN MAY

(Continued from page 328)

magnitude star, Alphard, stands conspicuously alone some distance southwest of Regulus. The interesting little quadrilateral of stars known as Corvus, the Crow, one of the Riders of Hydra, is now conspicuous in the south and next to it on the west is its less noticeable companion, Crater, The Cup. The Big Dipper is seen at its best in May for at this time it lies on the meridian at its highest altitude above the pole. Cassiopeia and Cepheus, so prominent in the northern sky in winter, are now below the pole close to the northern horizon.

Mercury may be found in the northwestern sky in the evening twilight during the first few days in May but it is approaching the sun and will soon be too close to the horizon at sunset to be visible.

Venus is now a brilliant evening star in the northwest in Taurus. Jupiter is also in Taurus and will be found a few degrees to the east of Venus early in May. The two planets will be in conjunction on May 17 when Venus will be due north of Jupiter and a little over a degree distant from it.

Saturn is now in Sagittarius and will be found nearly due south shortly before sunrise. Mars is in Pisces and is low in the east at sunrise.

LAND OF LAKES—HOW AND WHY

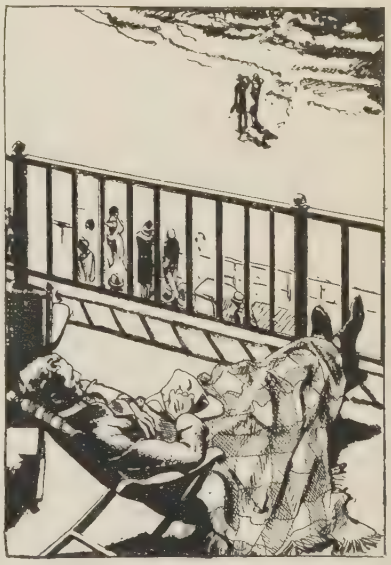
(Continued from page 331)

those of the south. The surface was rough in many parts before the ice sheets rode over it, in fact, semi-mountainous. While the ice tended to smooth off this surface, it was only partially successful. Instead of hundreds of feet of glacial drift covering the hard rocks as in the south, the deposits in this northern region were thin in most part, so that the ancient rocky base is exposed over great areas. Lake basins were hollowed out of the rock; it is an area of glacial erosion, in contrast to the heavy deposition found to the south.

In terms of the geologist's conception of time, the last glacial encroachment is very recent. But many things have happened since the withdrawal of the ice, to prepare this region for human occupation and to differentiate its parts. Forests have grown and have been replaced by other forests of different character. Prairie grasses have thrived through thousands of years. Through the interaction of glacial deposits, vegetation and climate, soils of great variety have developed. Man's rapid conquest and exploitation played their parts in the changes which have arisen. Yet just as time will chisel new lines on a sculptured face, yet not change the features carved by the sculptor, so have post-glacial events altered but little the general outlines of surface left by the ice.

The four pages of colored bird pictures by R. Bruce Horsfall, previously announced to appear in June, are being scheduled for July, mechanical difficulties having prevented their inclusion in the earlier number.

What a place to tone up



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Each month this page will be published in NATURE MAGAZINE. On it will be listed books in two classifications. The first group includes those volumes of current publication regarded by the most competent authorities, consultants of this Association, as outstanding and valuable. The second group includes those books in various fields which are regarded as somewhat standard works and yet are still available from the publishers.

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PHOTOGRAPHIC DEPARTMENT

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as well as faster and slower speeds, and "time" and "bulb."

"The reason for selecting an anastigmat lens of from *f*:5.6 to *f*:6.8 is that which most Nature photographs are taken with stops *f*:8 to *f*:22 in order to secure depth of focus there are occasions when one is working on larger objects as longer range when the ability to use a larger stop than *f*:8 means the difference between a hopeless underexposure and a good picture.

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Hiawatha Land

The Upper Peninsula of Michigan, part of the setting for Longfellow's poem, *Hiawatha,* is just as wonderful and varied as it was when Gitche Manito, the Great Spirit, established his home on the tip of Sugar Loaf on Mackinac Island, writes Aaron Lowenstein, prize winner in the *Times* Essay Contest, in the Upper Peninsula Development Bureau *News*. Since the days when Hiawatha lived out his life with Minnehaha in peace and happiness by the shores of Gitche Gumee, the Big-Sea-Water, when Pau-Puk-Kewis sped westward toward Munising "to the pictured rocks of sandstone" great changes have taken place. The Indian no longer roams the forest, for both the Indian and the forest have largely gone; instead, it is the visitor from other states that the Upper Peninsula lures to fish its streams, enjoy its parks, and to gain health and contentment amid its scenery and invigorating air. It is estimated that 92,000 automobiles entered the peninsula from St. Ignace alone in 1927.

Women Clubs Active

The Minnesota Federation of Women's Clubs, of which Mrs. P. J. Schwarg of Dodge Center is the former Conservation Chairman, is one of the active conservation forces in the North Star state, and began work, twenty-five years ago when it was instrumental in saving forest lands in the northern part of the state by urging the establishment of a state park. Though handicapped by lack of funds, it has carried on rigorous educational campaigns, planted living Christmas trees, memorial trees and memorial forests, and has worked to prevent the flooding of lands in Superior National Forest. A record in tree planting was established by a St. Paul Club which set in the ground 93,990 fruit-bearing shrubs in cooperation with the Park board.

Bird Pictures

A series of colored bird pictures of post-card size has recently been issued in sets of sixty by the National Museum of Canada, at Ottawa, Ontario. Each card contains descriptive notes on the species illustrated such as size, color, range, habitat, distinguishing marks and characteristics.

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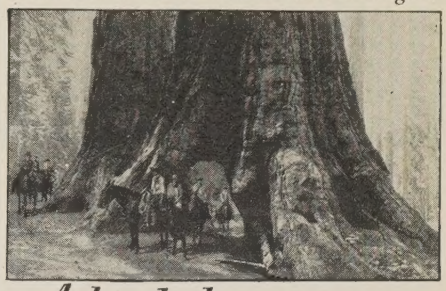

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Wisconsin Conservation

Wisconsin, whose Conservation Commission of six members was established in 1927, is one of the leading states in conservation policies. During the past three years more progress has been made than in any similar period before, according to Duane H. Kipp, Superintendent of Education and Publications.

Among the accomplishments Mr. Kipp points out are the adoption of a new forestry policy destined to replant Wisconsin's idle acres, the development of a game farm growing mammals and birds, an extended fisheries policy which includes the rearing of fish to larger size before distribution, and a new state park policy that emphasizes the educational uses of state park lands. Law enforcement, in addition, he asserts, is more efficient, and public opinion, under the influence of an efficient public relations department, is swinging more and more toward conservation ideals.

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